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Because good teachers are in short supply, it is necessary to find ways of increasing their effectiveness. Students learn as much from television as from conventional instruction when the programs are viewed for academic credit. Experiments at Pennsylvania State University (1954; 1956-57) showed that it is difficult to assess the value of such telecasts. Faculty and students felt that large classes (over 200), and a desire for the best teaching available, encourage television, while a lack of student-teacher feedback discourages it. In 1955, programs were introduced in the public schools which led to the National Program. This was intended to determine the feasibility of television instruction as a major resource, to teach larger classes with fewer teachers and classrooms, at the same time raising the quality of instruction. Maximum class sizes were 175 in elementary schools, and 500 at the junior and senior high levels. The television students performed better than conventional students over the two-year test period. Television, though subject to imperfections, provided, by and large, many advantages over conventional teaching. Its imperfections emphasized that the technique is not a panacea, but a tool whose effectiveness resides mainly in the resourcefulness of the user--in this case, the teacher. (TI/GO)

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Teaching by Television

A Report from The Ford Foundation and
The Fund for the Advancement of Education

EM000814

Teaching by Television

Dr. Harvey E. White, professor of physics
at the University of California at Berkeley, teaching by television

"Teaching by Television" is a joint publication of the Ford Foundation and the Fund for the Advancement of Education. Both organizations have worked cooperatively on educational television and have made grants to support projects in this field.

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Preface

The beginning of a new era in American education may well be marked by the experiments described in this report.

These experiments involve the use of television—not occasionally, not as an educational "extra," but regularly, as a basic part of the daily instruction.

Supported in part by the Ford Foundation and the Fund for the Advancement of Education, the experiments represent a search for better ways to teach the nation's growing student population and to make available to these young people instruction of a higher order than they might otherwise receive.

The use of television for this purpose may still be novel. Yet the experiments described in this report involve more than fifty colleges and universities, 250 school systems, and, in the present academic year, more than 300,000 students and their teachers. No accurate figures are available on how extensively teaching by television has grown since these experiments began. A conservative estimate, based on data provided by noncommercial, educational-television stations in twenty-six states, is that this school year about 7,500 elementary and secondary schools are offering some instruction by television to around three million pupils. This does not include pupils receiving their television lessons over open-circuit commercial stations or closed-circuit installations, who may number an additional one and a half million.

To be sure, the tested experience with television for regular instruction is relatively brief. Most of the experiments date back no more than a few years. This progress report will not describe in detail all the experiments supported by the Foundation and the Fund, but rather will attempt to summarize what has been done and what has been learned to date.

A list of the schools and colleges that have undertaken classroom television experiments with Foundation or Fund support is in Appendix I, together with the names of the persons who can supply further information.

The Picture in Perspective

A distinguished professor once remarked that it took about fifty years for a new idea to gain general acceptance in American education. A few years ago not many educators would have quarreled with that assertion. During the past four or five years, however, there has been a restless stirring in the nation's schools and colleges. This ferment has taken the form of a questioning of accepted practices, a challenging of long-held concepts, and a search for new and better ways of going about the job of providing a better education for the nation's young people.

In part, this ferment has been stimulated by the unprecedented increase in the number of boys and girls to be educated. Since the end of World War II, the number of births has risen more than fifty per cent, and each year for the past five years it has hovered around the four-million mark, which is one and one-half times the level of the depression decade of the thirties. Enrollments have risen steadily at all levels of education, and as wave upon wave of new students have swept upward through the grades, educators have come to realize that this is not a temporary phenomenon, but a problem—and a challenge—that will be with us for the foreseeable future.

Coupled with the rapid rise in enrollments has been an acute shortage of able teachers. Since the end of the war, the number of new college graduates entering teaching has not kept pace with the number of teachers leaving the profession, and the number of poorly qualified teachers hired each year has remained distressingly high. This shortage of well-qualified teachers has now edged its way up to the college level, where the number of new faculty members with a Ph.D. is declining steadily while the number of new faculty members with less than a master's degree is rising at a corresponding rate.

The combination of a growing number of students and a shortage of able teachers has spurred many thoughtful educators to seek new ways of multiplying the effectiveness of the *good* teachers that are available at the school and college level lest a whole generation of young Americans be shortchanged in their education and, in turn, shortchange future generations when they themselves become teachers.

Two other factors that have helped to bring about a search for new approaches in education have been a dramatic increase in the range of knowledge today's students will have to acquire in order to live intelligently in the space age, and a similar increase in the complexity of the new things to be learned.

Some observers would argue that the greatest spur for improvement in American education came in the fall of 1957 when Soviet scientists launched, in quick succession, the first man-made satellite and the first passenger-carrying satellite. But actually the ferment was already under way. Sputnik and Laika merely accelerated the trend.

The past few years have brought a wave of bold and imaginative experimentation—in new ways of attracting a higher proportion of top-quality people into teaching, upgrading the teachers already on the job, extending the reach of superior teachers, making more effective use of time and space, challenging able students, and arranging the curriculum so as to put greater stress upon the new body of knowledge.

One of the most promising tools for attacking many of these problems has been television, the most powerful medium of communication yet devised by man. Commercial television burst upon the American scene shortly after the end of the war, and its growth since then has been nothing less than phenomenal. Ten years ago, there were only a few thousand receiving sets in American homes. Today there are more than fifty million. Commercial television has done more to influence American culture in the past decade than any other medium of communication. For better or for worse, it has also had a tremendous impact on the education of American children.

The direct educational value of the new medium was recognized early, and the Federal Communications Commission set aside some 250 channels for educational purposes. The Fund for Adult Education, established by the Ford Foundation in 1951, immediately took steps to help local communities establish educational stations. Through a series of matching grants, it was instrumental in the activation of about thirty of these stations. It also made possible the establishment of the Joint Council on Educational Television and the National Educational Television and Radio Center. (Since 1956 the Center has been supported by grants of more than $11.6 million from the Ford Foundation.)

Now only about eight years old (the first station, KUHT at Houston, began operations on May 25, 1953), educational television has grown almost as fast as commercial television. As of this writing, there are fifty-two educational stations in operation and nineteen more under construction. In addition, the Joint Council on Educational Television reports that there are more than 150 closed-circuit installations in schools and colleges throughout the country.

Educational television has two broad categories: cultural and informational programs broadcast principally over community-owned stations for an adult audience, and programs that are part of a school or college curriculum. The latter are also broadcast over educational stations but, in addition, use closed-circuit systems. This report is concerned with the latter category—*direct instruction by television.* Specifically, this means the use of television by schools and colleges to teach courses for credit.

Pioneers in the use of television as a medium of instruction were a few Midwestern universities, including Western Reserve and Iowa State, which first began to offer televised courses for credit about seven or eight years ago. The armed services also realized the potential of the new medium, and began to use it extensively for instruction and training purposes. Medical and dental schools in several universities soon discovered that television could provide every student a "front-row seat" in observing complicated surgical and dental operations and quickly adopted the new medium as a teaching tool. One of the earliest experiments at the school level took place in New Jersey in the spring of 1954, when fifth-grade students in the Red Bank and Long Branch public schools viewed a two-week series of televised lessons in American history that had been prepared by six teachers under the supervision of researchers at Montclair State College.

Today, practically every course in the school and college curriculum, from first-grade arithmetic to college zoology, is being taught somewhere over television.

Television's unique advantages as a medium of instruction are: first, it can vastly extend the reach of the nation's best teachers; and second, it can bring to students educational experiences that are quite beyond the potential of conventional means of instruction. In 1958, for example, fifth-graders in the Pittsburgh public and parochial schools had an opportunity to see and hear Robert Frost read some of his poems over television. The experience these youngsters had was quite different from the experience they might have had in a conventional poetry class. They were not reading Robert Frost's poems from a book, nor were they listening to their teacher read them. They were seeing and hearing the poet himself. This difference in experience might not show up on a standardized achievement test, which is designed to measure the subject-matter content mastered by a student in a given course, but it was nevertheless real.

When television first began to be used for direct classroom instruction, many questions were raised about its role in education. There were some who took a dim view of its potential. It was argued, for example, that television was essentially a one-way medium of communication and that its use for instruction would deprive the student of valuable contact with the teacher. As one critic put it, "an electronic tube cannot understand a child." It was also argued that learning would be reduced to a passive experience in which the student merely soaked up what was presented by way of a flickering image on a screen. Finally, of course, it was argued that "television will never replace the teacher."

What most of these arguments overlooked was that television is not a teacher, but merely a conveyer of teaching, and that a good teacher on television can be much more effective in stimulating *learning* than a mediocre teacher in the intimate environment of a classroom.

As teachers became more familiar with television as a medium of instruction, much of the early opposition evaporated. It soon became evident that television, far from being a threat to the status and prestige of the classroom teacher, was actually a powerful new tool for enhancing the art and prestige of teaching and for bringing to the student richer, broader, and deeper learning experiences.

The Fund for the Advancement of Education took an early interest in the possibilities of the medium for helping to meet important educational problems, and particularly the problem posed by the growing number of students and the continuing shortage of able teachers. During the past six years, the Fund and the Ford Foundation have provided financial support amounting to $20 million for a variety of experiments at the school and college level involving the use of television as a medium of instruction. Each of these experiments has been aimed at exploring the potential role of television as an instrument for improving the quality of education.

The primary focus of these experiments has been on multiplying the effectiveness of able teachers. Following are a few illustrative examples:

☐ At Pennsylvania State University and at Miami University, in Oxford, Ohio, closed-circuit television is being used successfully in the required freshman and sophomore courses, which traditionally enroll the largest number of students. At both institutions, it has been found that this method of handling large classes is not only educationally sound but also economically feasible.

☐ At Chicago City Junior College, open-circuit television is being used to bring the major portion of the freshman and sophomore curricula to students off campus.

☐ In Oregon, four colleges and universities have been linked in an inter-institutional television network, and outstanding teachers from each campus have been made available to the students at all four institutions.

☐ At the University of Minnesota, closed-circuit television is being used to enable student teachers, without being physically present, to observe teaching and learning situations in a classroom.

☐ In Texas, the facilities of a state-wide network of commercial stations were made available to the state department of education for reaching beginning teachers with a series of lecture-demonstrations designed to start them on the road to permanent certification.

☐ In Nebraska and Oklahoma, open-circuit television is being used to bring to students in small rural high schools college preparatory courses that otherwise would not be available to them because of the lack of qualified teachers.

☐ In Alabama, an educational-television network is being used to bring high-quality instruction to more than 300,000 students in 600 elementary and secondary schools throughout the state.

☐ In southwestern Indiana, sixteen school systems around Evansville have banded together to form an educational-television council, which is financed out of a common treasury. The council makes available to students in each member school system, and in a group of neighboring schools, the combined teaching resources of all.

☐ In Washington County, Maryland, a closed-circuit television network that eventually will link up all fifty schools in the county is being used to bring daily instruction in thirty-one courses—at all grade levels—to nearly 16,500 students.

☐ In more than a dozen large cities throughout the country, television is being used as a major resource in the teaching of classes several times the size of conventional classes.

☐ In New York City, closed-circuit television is being used in a low-income housing project to bring the school and the community closer together and to help overcome the language barrier between English-speaking and Spanish-speaking children.

☐ Over the nationwide network of the National Broadcasting Company, outstanding teachers have taught courses in modern physics and chemistry. The program is continuing this year with a course in modern mathematics and a re-run of the chemistry course. Well over 400,000 high-school teachers, school and college students, engineers, housewives, and others have been regular viewers of the program. Since it presents full college courses offered for credit by institutions throughout the country, the program is appropriately called "Continental Classroom."

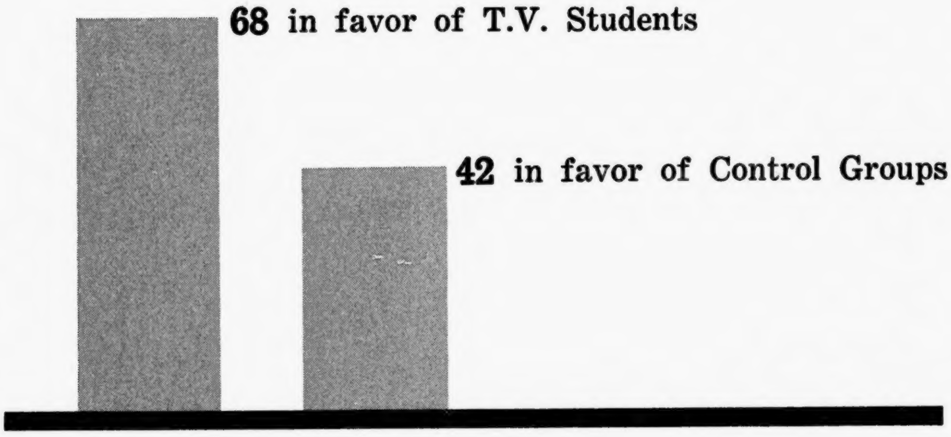
Although it is too early to draw any final conclusions about television's ultimate role in education, the results of the experimentation to date have been very encouraging. These results show, among other things, that students at both the school and college level learn as much—and in some cases significantly more—from televised instruction as from conventional instruction. The usual finding from most of the experiments has been that there is no significant difference in achievement between students in television classes and comparable students in regular classes. This finding is in itself remarkable, in view of the newness of television as a medium of instruction, the relative inexperience of those who have been using it, and the fact that existing school and college classrooms as well as existing television equipment were not designed for televised instruction.

Interim results from two of the most extensive school experiments indicate that superior teaching over television stimulates

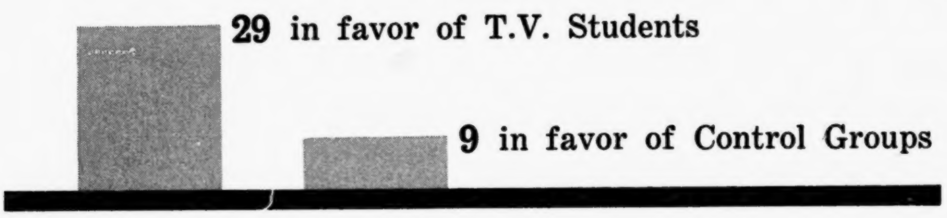
THE NATIONAL PROGRAM IN THE USE OF

Test Results For 1957-58

Number of Comparisons Favoring T.V. Students and Number Favoring Control Groups



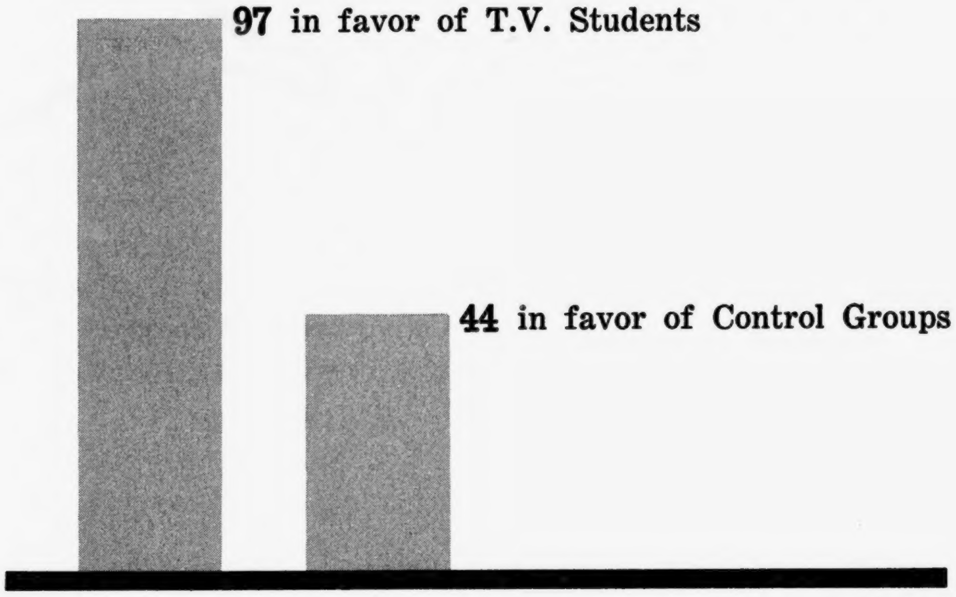
Significant Differences in Achievement



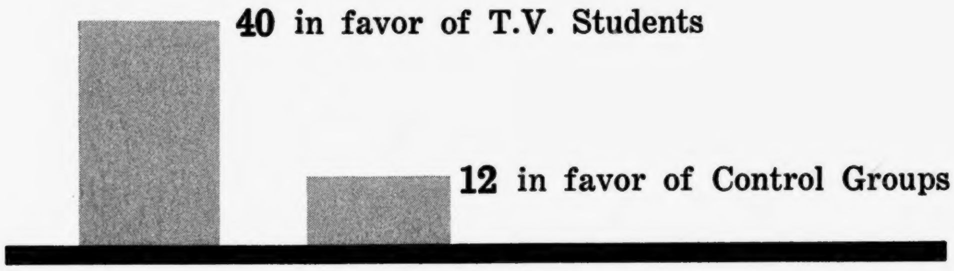
TELEVISION IN THE PUBLIC SCHOOLS

Test Results For 1958-1959

Number of Comparisons Favoring T.V. Students and Number Favoring Control Groups



Significant Differences in Achievement



much better learning on the part of the student than ordinary teaching in the classroom. This has been particularly true when the team approach to teaching has been employed—when studio teachers and classroom teachers have pooled their skills and each has undertaken that particular part of the total teaching job to which the individual teacher is best suited by interest, ability, and temperament.

The two experiments where this method of teaching is producing results superior to conventional methods are the Washington County, Maryland, project, involving some 16,500 students, and the National Program in the Use of Television in the Public Schools, a nationwide project that in 1959-60 involved nearly 200,000 students in some 200 public school systems throughout the country.

Preliminary test results concerning the achievement of Washington County students in classes taught by television have been compared with the achievement scores of students in conventional classes, as well as with previous records. The results show an impressive gain by students who received televised instruction.

The results of the first two years of testing in the National Program are illustrated on the preceding pages. Altogether 251 different comparisons were made. In 1957-58, they included 14,326 television students and 12,666 control students of equal ability; and in 1958-59, they included 43,105 television students and 26,092 control students. Of the 251 comparisons made during the two-year period, 165 favored the television students and eighty-six favored the control students. In ninety cases, there was a statistically significant difference in the achievement of students in the two groups—that is, a difference that could not reasonably be attributed to chance. Of these statistically significant differences, sixty-nine were in favor of the television classes and twenty-one were in favor of the control groups.

Other encouraging results have emerged from the experimentation. For example, it has been found that televised instruction requires the student to accept more responsibility for his own learning than is the case with conventional methods of instruction. Also, students in television classes at the elementary and secondary level make more extensive use of the school library than students in regular classes.

In addition, experience to date has shown that the team approach to teaching, particularly at the elementary and secondary levels, opens up exciting new possibilities for capitalizing on the varying teaching skills among teachers in any given school system. Televised courses have been much more carefully planned and organized than conventional courses, and the combination of the skills of the studio teacher and of the classroom teacher has made possible a cooperative teaching effort far better than either teacher could achieve alone. At the elementary and secondary levels, for example, the usual practice has been for the studio teacher to "meet" only one class a day, generally for twenty or thirty minutes. The teacher then has the rest of the day to plan tomorrow's lesson. This opportunity to plan carefully, combined with the unique possibilities that television affords in the presentation of visual materials that reinforce learning, has stimulated the studio teachers to do a much better job of teaching than they had done in their conventional classes. In the meantime, the classroom teachers, relieved of the burden of planning and presenting the principal material in several different subjects during the course of a day, are free to concentrate on other important aspects of teaching—such as eliciting student participation, answering questions, leading discussions, reinforcing when necessary the main concepts presented in the telecast, providing individual help where needed, and stimulating the students to do something with what they have learned. Studio teachers and classroom teachers who have mastered the techniques of the team approach say they greatly prefer it to the conventional method of teaching.

One other important result of the experimentation to date has been a more effective use of teaching time and classroom

TEAM TEACHING IN TELEVISION CLASSES

1 The studio teacher, classroom teachers, and curriculum specialists cooperatively plan the course in advance and prepare teacher guides.

2 The studio teacher presents, explains, and demonstrates the major points of the lesson, raises questions, and stimulates student interest.

3 The classroom teacher prepares students for the telecast part of the lesson, answers questions, clarifies points, leads discussion, makes assignments, gives individual help, and supervises testing.

4 The studio teacher and classroom teachers confer regularly to evaluate the lessons and make improvements.

space. This has been especially true in the elementary and secondary schools, where the shortage of teachers and classrooms is most acute. Several school systems, notably those of Dade County, Florida, and Washington County, Maryland, have found that the use of television in teaching large classes has enabled them to serve more students with the able teachers already on their staffs and to get along with fewer new teachers than they otherwise might need. This means that they can be much more selective in hiring new teachers. The use of auditoriums, cafeterias, and other large rooms for certain television courses also has meant a substantial saving in classroom space.

Several other school systems have used the teacher time saved by the use of television in large classes to establish much smaller classes than usual for slow learners and for rapid learners, and to provide overworked classroom teachers with one or more free periods during the school day.

Finally, the use of superior teachers on television has proved an important means of upgrading the quality of other teachers, particularly beginning teachers. Several superintendents have reported that television has brought a system-wide improvement in teaching, and that even some of their best teachers have learned new techniques by observing the studio teachers.

There also have been problems.

One of the biggest single problems at the elementary and secondary levels has been that today's school buildings were not designed for instruction by television, especially in large classes. (A study of building and space designs for the use of television in education was published in 1960 by Educational Facilities Laboratories, an independent organization established by the Ford Foundation. The study, *Design for ETV,* is available upon request to Educational Facilities Laboratories, 477 Madison Avenue, New York 22, N. Y.)

Aside from the problem of learning how to house the new teaching patterns evolving from television, these patterns themselves—for example, the large class and the team approach—have yet to be fully mastered. In large-class situations, further exploration is needed on how to deal effectively with differences among individual students, especially at the elementary and secondary levels. And although some teaching teams are functioning skillfully, the respective roles of the studio teacher and the classroom teacher remain to be fully defined.

Another problem at the elementary and secondary level—particularly in those school systems using open-circuit telecasts originating from educational-television stations—has been the matter of scheduling. This has taken two principal forms. First, there has been the difficulty of timing the telecasts to fit the schedules of as many schools as possible. (For example, fifth-grade arithmetic is not usually taught in all elementary schools of a given school system at the same hour each day.) The second aspect of the scheduling problem has been how to fit a thirty-minute telecast into class periods of varying length. (Observers agree that thirty minutes is not necessarily the optimum length of the telecast part of the lesson in every subject every day, but educational-television stations, like their commercial counterparts, traditionally operate in terms of thirty-minute blocks of time.)

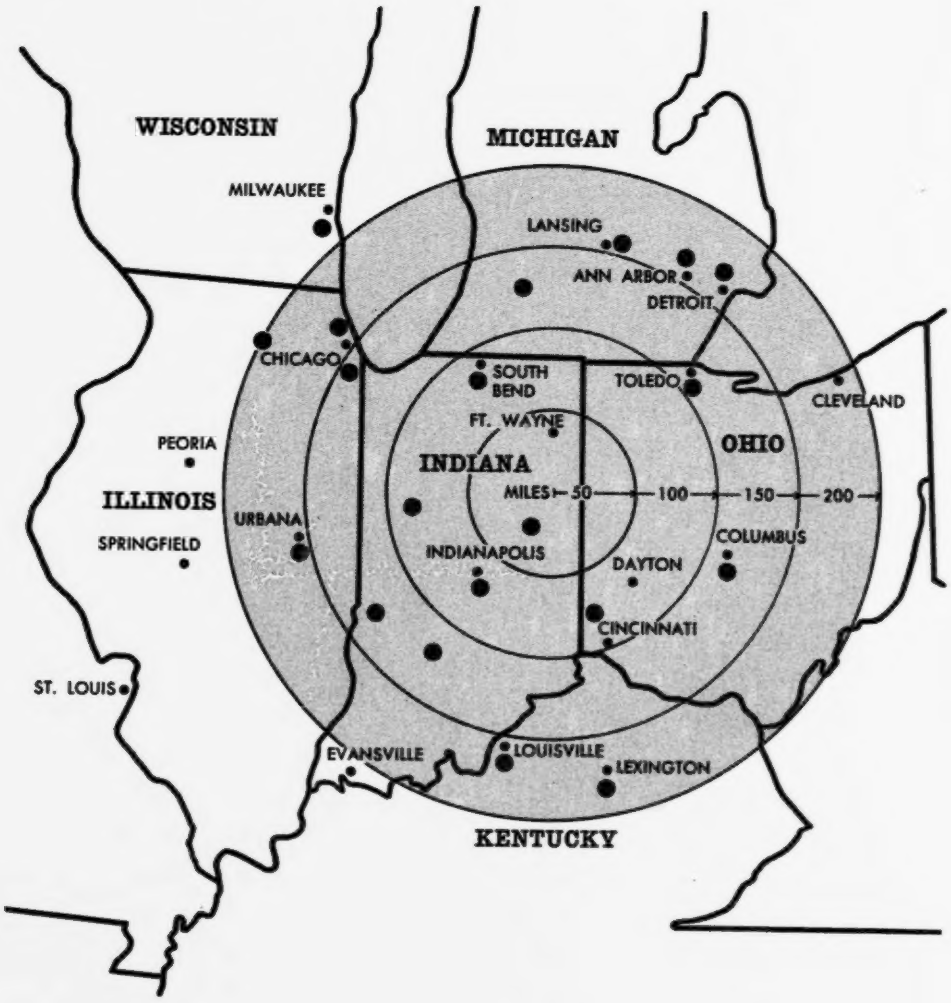
A technological problem that currently limits the use of television as a medium of instruction has to do with transmission of the signal. Open-circuit broadcasting, in which the signal is sent out from a transmitter, has the advantage of being able to cover a wide area, and thus it can reach many school systems. It has the disadvantage of being limited to one program or lesson at a time. This means, for example, that in the course of a six-hour school day only twelve thirty-minute lessons can be broadcast—the equivalent of only one for each grade level. Closed-circuit broadcasting, in which the signal is carried by coaxial cable, has the advantage of being able to transmit several lessons simultaneously (six in the case of Hagerstown), but it has the disadvantage of not being able to cover a wide geographic area except by the use of microwave relays or long-line telephone wires, both of which are relatively expensive.

Preparation for a novel open-circuit television experiment designed to make courses available to schools and colleges within a 150-to-200-mile radius of the transmitting point has been under way during the past year under the direction of the Midwest Council on Airborne Television Instruction, which is composed of educational and civic leaders from the six states involved—Indiana, Illinois, Kentucky, Michigan, Ohio, and Wisconsin. (See map page 16.) Videotaped courses will be broadcast from an aircraft flying at 23,000 feet over east-central Indiana. Demonstration courses will begin early in 1961, and a full school year of broadcasting will start in September, 1961. Two standard-band UHF channels will carry courses ranging from the elementary-school level through college six hours a day, four days a week during the 1961-62 academic year. Meanwhile, the Council will experiment with the application of narrow-band UHF channels, which could double available UHF transmission space.

The Council's main headquarters are located at Purdue University. It has developed an initial curriculum and screened and selected a corps of television teachers to prepare courses and supplementary materials and to videotape lessons at various production centers. The Council has also established centers at colleges and universities where area committees of educators, technical experts, and lay leaders counsel interested schools and conduct workshops for classroom teachers. To help finance these activities, the purchase of aircraft, transmitting and other equipment, the Ford Foundation has granted $4.5 million. Business and industrial firms are also supporting the experiment.

Potentially, the experiment could transmit simultaneously over six channels and thus telecast a total of seventy-two expertly taught lessons a day to schools and colleges over an area that includes five million students. In particular, airborne television provides a new resource to small rural schools presently out of reach of educational-television stations.

MIDWEST PROGRAM ON AIRBORNE TELEVISION INSTRUCTION



Large dots show location of college and university centers where area committees have been established to work with schools participating in the program.

Videotape, which is being used in the airborne-television experiment, is a technological development that is helping to surmount many of the technical and administrative problems impeding the adoption of television for teaching. Recorded on magnetic tape rather than film, lessons can be more readily reproduced for later showing than with kinescopes. The visual quality is equal to that of a live telecast. This method of recording broadcasts has brought a new dimension of flexibility to educational television. First, lessons can be recorded in the studio at a time convenient to the television teacher, instead of being limited to broadcasting times. Second, once on tape, they can be shown at alternate times, thus making it easier to accommodate them to different academic schedules. Third, because an unlimited number of copies can be made from a single tape, their possible distribution is greatly multiplied. Finally, lessons can be stored for use in subsequent semesters and revised or updated as teaching experience or course content may require. The advantages of videotape are being provided to many communities through grants by the Ford Foundation to the National Educational Television and Radio Center for the purchase of recording equipment by its affiliated stations.

To sum up, television has already demonstrated that it can be a powerful tool for helping to raise the quality of education in the face of rising numbers of students and a shortage of able teachers. It also has demonstrated its potential for attacking other important educational problems, such as challenging able students to their full potential and bridging the gap between school and college; bringing top-quality teaching to students in small rural high schools; upgrading the quality of teachers already on the job; and finally, making more effective use of the physical and financial resources available to schools and colleges.

Much has been learned in the past six or seven years about television's potential as an important educational resource; much more remains to be learned. On the basis of the experimentation to date, it appears that when schools and colleges have learned to capitalize on the full potential of the medium, students at all levels will receive a far broader, deeper, and richer education than has been possible heretofore.

The College Experience

Well before most of the experiments described in this report began, a few pioneering colleges and universities were offering courses over television for the benefit of the general public. But there was no assurance that television could be used effectively for direct and systematic instruction of students either on campus or off campus. How well could teachers really teach before the television cameras? How well could students learn in front of the receiving sets? Would students and faculty members accept the new medium? And what would televised instruction cost, in comparison with the cost of conventional instruction?

In 1954, the Fund for the Advancement of Education made a grant to the Pennsylvania State University for a systematic inquiry into these and related questions. This was the beginning of the most extensive program in the use and evaluation of televised instruction in American higher education. By the spring of 1958, four years after the original grant, some 3,700 of Penn State's 14,000 students were registered for one or more of thirteen courses taught over closed-circuit television on the campus at University Park. (See page 30 for a summary of the major findings in the Penn State experiment.)

For experimental purposes, televised teaching in the initial stage at Penn State was deliberately kept as similar as possible to the teaching in an ordinary classroom. The television cameras were set up in regular classrooms, and the teachers had classes of students in front of them as they taught—a group of forty or fifty in one case, and about 150 in another. Student technicians manned the cameras and staff members operated the controls. A coaxial cable carried the sound and picture signals to television receiving sets in nearby classrooms, where other groups of students met. It soon became clear, however, that this was not the best way to take full advantage of the potentialities of television; during the next semester the courses originated from a smaller classroom, with few or no students present. Most instructors still believed they needed some students present to help pace their presentations. But this practice also had its disadvantages, and gradually it was abandoned too. Most instructors at Penn State now teach directly into the cameras, so that there is direct eye-to-eye contact between the teacher on the television screen and the student. This also has become the general practice elsewhere.

In colleges and universities, attempts have been made to try on television a wide variety of courses in the undergraduate curriculum. Most of the courses selected have been those that enroll relatively large numbers of students and that traditionally are taught in large part by the lecture method, or by lectures illustrated with demonstrations. Examples of undergraduate courses that have been taught by television are given on the opposite page.

Some of these courses were conducted entirely by television—for example, courses in general psychology, introductory sociology, music appreciation, elementary meteorology, and air science at Penn State. The only personnel needed other than the instructor were supervisors or proctors in the classrooms, and sometimes it was possible to dispense with them.

This arrangement was criticized on the grounds that students could not ask questions for clarification. Some institutions therefore assigned at least a responsible graduate assistant to each receiving room. Of course, not all teachers were sorry to see questions eliminated; some believed that if one outcome of televised instruction would be to force students sometimes to find answers to questions on their own, the students would thereby become more resourceful in directing their own learning.

EXAMPLES OF COLLEGE COURSES TAUGHT BY TELEVISION

University of Florida

French, Humanities, Survey of Communications

Miami University (Ohio)

Educational Psychology, English, Physiology, Zoology

University of Missouri

Advertising, Agricultural Economics, American Government, American History, English Literature, Farm Programs, International Relations, Psychology, Public Speaking, Sociology

Oregon State Board of Higher Education

Appreciation of Literature, Descriptive Geometry, Geography, Psychology

Pennsylvania State University

Accounting, Air Science, American History, Anthropology, Differential Calculus, Economics, Education, Meteorology, Music, Psychology, Sociology, Zoology

University of Texas

American History, Chemistry, German, Introduction to Visual Arts, Psychology

Wayne State University

Biology, Chemistry, Humanities, Political Science, Psychology, Public Health, Teaching of Arithmetic

Criticism of the lack of opportunity for questions led to experiments with two-way communication systems at Case Institute of Technology, the State University of Iowa, and Penn State and Washington State Universities. The latter three used simple "talk-back" sound systems, but Case developed two-way television, so that the instructor could both see and hear his students.

There has been general doubt that individual students can be quizzed with real efficiency when a section numbers 200 students or so. It is also doubtful that the present two-way systems are adequate to sustain a provocative discussion among students in various classrooms. Because of such limitations, the most common use of television at the college level has been to combine it with traditional techniques—to mix televised lecture-demonstrations with face-to-face sessions in smaller groups for discussion, problem solving, recitation, or laboratory work. Most often, the different sessions have not been held on the same days of the week.

To avoid the loss that results from separating the lecture and follow-up discussion by a day or more, there have been several experiments with a divided period—thirty or thirty-five minutes of televised instruction and a discussion session of fifteen to twenty minutes.

Miami University in Oxford, Ohio, has developed still another alternative in an educational-psychology course that meets twice a week for ninety minutes each time. The instructor lectures over television for the first hour or so. Then graduate assistants or seniors majoring in psychology lead discussions among the students in the receiving rooms for the remaining thirty minutes.

Endless variations are possible in determining how best to use class time. An experiment with a literature course at New York University showed that three times as much material could be covered in a televised lecture as in a conventional one, because of the better preparation of the instructors and the absence of interruptions by the students. This calling into question of the traditional ways of organizing college courses may well be a valuable by-product of the effort to adapt courses to the television medium.

Comparative Effectiveness

The primary concern of all the experiments, school as well as college, is with the effect of televised teaching, in its many forms, on student learning. This is a question not easily answered, for only crude instruments are available for measuring the complex process of learning. Ideally, the objectives of a course should be established firmly in advance, and then tests can be prepared to measure how well these objectives are achieved. But the objectives of most college—and school—courses are not and can not be stated in such behavioristic terms. They exist vaguely in the minds of the teachers, and considerable effort is required to arrive at statements specific enough to guide educational psychologists in preparing scientifically acceptable tests—even tests designed to measure only factual learning.

In addition to the mastery of subject matter, educators usually have many other objectives in mind—for example, to teach students to think more critically and make sounder judgments, to deepen their interests in many areas of human experience, and to acquire attitudes favorable to their major fields of study. Attempts to measure the contributions of teaching in these terms have not been very successful.

Nevertheless, the effort to measure more than the acquisition of information has been pursued in the various college television experiments, notably in general psychology courses at Penn State. The first trial took place in the spring of 1955. Two instructors were involved. During the morning, one taught over television a class of forty in the originating room and two other classes of forty in "remote" classrooms, while the second instructor taught a class of forty in a conventional classroom in another building. Later in the day, the instructors reversed their situations. The students were assigned to the different classes at random. The instructors did not change their usual teaching methods but as far as possible presented the same lectures over television that they presented to their conventional classes. On the final examination, there was no difference in achievement between students in the television classes and those in the regular classes. When they were asked to rate the course relative to other courses for its contribution to their educational advancement, the students taught over television rated the course lower than the other students rated their conventional classes. But no differences were found in the students' general attitudes toward psychology as a field of study, in the extent to which the course affected their "authoritarian" attitudes, or in continuing their study of psychology in another course. Considering that the instructors in the experiment were somewhat negative in their attitudes toward teaching over television in the first place, that little was done to adapt the course to television instruction, and that nothing was done to compensate for the lack of discussion in the television class, the Penn State experimenters found the results of this early experience highly encouraging.

During the fall of 1956-57, a second experiment took place with the general psychology course at Penn State. In part, it was a comparison between use of closed-circuit television, reaching a large class spread through many small rooms, and use of a large lecture hall where 200 or more students could be taught in a body.

Two instructors again taught the course in both situations, teaching the large class immediately after the television class and taking care to cover the same material each time. They adapted their methods, however, to make use of techniques best suited to the two situations. Because it seemed possible that in the previous experiment textbook reading might have accounted for no difference in examination scores, the course was taught in the second experiment without a textbook, so that greater emphasis was placed on learning while in class. Finally, two competent test constructors spent almost full time working with the instructors to build tests that hopefully would measure not only factual learning but learning of principles, understanding of complex concepts, and ability to solve problems. Again students were randomly assigned to the various classes. They were not aware of being subjects in an experiment. Four different tests were administered during the term, including the final examination; the analysis illustrated the importance of not depending on any single test. In one test, the results favored the television classes; in another, the large class. But no difference in achievement was apparent on the other tests, and the average total score for the semester also revealed no difference in achievement between the classes taught by the two methods.

Generally, the same result came from the other college experiments that compared televised teaching with classroom teaching in groups of varying size. The television students did as well in general chemistry, elementary business law, introductory sociology, elementary meteorology, and music appreciation at Penn State; in educational psychology, air science, and physiology at Miami University; in English composition, French reading, and history at New York University; in American government and modern literature at the State University of Iowa; in introductory sociology at Washington State University; and in psychology, basic communications, creative arts, and economics at San Francisco State College. In some instances, the generalization did not hold, perhaps because of the nature of the subject, or the skill of the instructor, or the length of time the students were exposed to televised teaching. Tests at Miami University, for example, suggested that the course in introductory economics might not be suitable for television, possibly because of the abstract nature of what must be learned. Nevertheless, most researchers believe that much more experimentation is needed before they can validly determine which courses can best be adapted to television. It is clear, however, that in many college courses students can be expected to do equally well in examinations whether they have been taught by a teacher in a regular classroom or by the same teacher over television.

Faculty and Student Opinion

The most valid test of faculty opinion may come from the teachers who either volunteer or accept an invitation to teach over television. At Penn State, where wide use of television has been encouraged, this number increased as experimentation in the medium continued. Curiosity or a desire to experiment may account for part of the increase. But in some cases it was clear that a majority of the departmental faculty approved the use of television in the belief that it would mean better teaching, especially in courses with large enrollments.

The course in elementary accounting in the School of Business at Penn State illustrates this line of reasoning. This course was required every year of several hundred students. The classes were handled by all ranks of teachers from graduate assistants up to associate professors. Some of the graduate assistants were popular with the students, and some taught well, but there was a feeling among the regular members of the department that the teaching was not always as good as it might have been.

In the fall of 1957, a teacher with long experience and an unusual ability to stimulate an interest in his subject taught several elementary-accounting sections over television. He gave two weekly lecture-demonstrations while graduate assistants directed a weekly "laboratory" period. By mid-year, students were asking to switch from small conventional classes to a television class with this superior instructor. The arrangement was thought so successful that the School of Business decided to teach almost all elementary-accounting sections in this way the following year.

The polls at Penn State showing that some 15 per cent of the faculty were willing to experiment with television in their own courses revealed a growing interest in doing so. They indicated also that many of the non-TV teachers viewed the innovation with disfavor. These teachers objected because they did not have contact with the students; they could not give the students individual attention, gauge the students' response to the presentation, or have the students ask them questions. If student enrollments should make it necessary for these teachers either to teach over television or to teach face-to-face in classes of 150 or more, a significant proportion said they would prefer the large classes. The most favorable vote for television among the faculty at large was the fact that the majority favored having their own children take a course by television from the best professor in a department rather than from a lesser but adequate professor in a regular class.

The medium itself seems to be something most teachers can become accustomed to—after some initial adjustment—and the general opinion is that they like it better than they thought they would. But teachers with brief experience in television do not prefer it to the way they have been teaching for many years. However, when they have been asked to compare the values of teaching by television with teaching in classes of 150 students or more, they have rated teaching by television superior by a large margin.

Careful polls of student opinion at Miami, Penn State, and San Francisco State have shown that students usually prefer a conventional class, and usually think they learn more in such a class. They may object to television because of no contact with the instructor, because they become bored and sleepy watching the television screen, or, in some courses, because the cameraman has too much control over what they are able to see. But others prefer television, either because there are fewer distractions, because the novelty of it makes the class more interesting, or because the professors are better, or better prepared.

Even though many college students do not ordinarily prefer televised teaching, there are circumstances in which they do—or would. At Penn State, students were given some experience with both television and classes of 150 or more, then told to choose one or the other for the rest of the semester; they chose television, six to four. At Miami, a majority of the students have said they would enroll in a television class any time—if it meant they would be assured of being taught by an excellent instructor.

These experiments have been intended, of course, to test the effect of *televised* instruction. In the interest of careful measurement, they have compared the work of *the same teacher* when he was teaching by this medium and in the classroom. But in courses with large enrollments, this is not the practical choice before either an institution or an individual student. The choice is between one teacher on television and several in the classroom. The experiments have made no attempts to measure whether one teacher is able to do a better job of teaching over television than others can do face-to-face, but some faculty members and many students certainly believe there are teachers who can. As more truly superior teachers come to use television, and as the number of less able people on college faculties increases, televised teaching can be expected to grow as an effective new asset in the task of maintaining the quality of instruction in American higher education.

From appropriations totaling $2 million, the Ford Foundation has made grants to thirty-six institutions since 1955 to encourage good college teachers to appear before the cameras. Its early assistance financed released time for faculty members to prepare lectures of interest to the local community. For the past two years it has been underwriting released faculty time only for the preparation and teaching of televised college courses for credit. Videotapes and kinescopes of these courses should contribute significantly to the growing library of instructional-television materials available for exchange among colleges and universities.

The Feasibility of Televised Instruction

It might seem offhand that the comparative cost of televised instruction at the college level could be easily determined. But this is not a simple matter. One reason is that cost figures are meaningless except as they relate to the figures for other methods of instruction. But these methods are so varied on college campuses, and may be expected to change so much in the coming years, that comparisons must be made course by course.

The most thorough accounting available so far was made at Penn State during 1956-57. The costs of conventional and televised instruction were compared in general psychology, introduction to accounting, introductory sociology, and air science. In all four courses, televised instruction was found to be less expensive than conventional teaching. This was so for many reasons. Penn State used equipment that was relatively low in cost. Students served as cameramen. Other students served as engineers. (A full-time engineer was not hired until April, 1957.) There was a plentiful supply of graduate assistants. Undergraduate students served as room proctors in many cases. Most important of all, enrollments in the courses were high, ranging from 169 in sociology to 810 in air science. With these factors operating, Penn State was able to conclude that televised teaching in these courses cost less than conventional teaching. It was found that televised instruction could "break even" with conventional methods when 200 or more students were taught simultaneously in a given course. With 16,000 students on the campus, Penn State can expect to enroll more than a thousand students each semester in many of its freshman and sophomore multiple-section courses.

The cost of operation elsewhere may be lower or higher than at Penn State. At Miami University, where another careful accounting has been made, it was found that televised instruction can "break even" when 220 students are taught simultaneously in a given course.

The most significant factor affecting future costs, however, will be the larger numbers of students involved. Already there have been instances in the college experiments where many more students could have been enrolled in a television section than actually were enrolled. As institutions expand, many more of them should be able to make economical use of the medium, and those already as large as Penn State may find that a television system can actually save money without impairing the quality of instruction.

SUMMARY OF FINDINGS AT PENN STATE

Comparative Effectiveness

1. In 29 out of 32 controlled comparisons in seven different courses, there were no significant differences in *achievement* between students taught via closed-circuit television and those taught in the conventional manner. (The *same* teachers were used in each pair of comparisons.)
2. In three different courses, there were no significant differences between scores on course-related *attitude* tests taken by students taught via TV and those taught by the same teachers in the conventional way.
3. No significant differences in students' achievements were found when *proctors of varying status* were used to supervise classroom groups of students in televised classes. Proctors included peers, seniors, graduate students, and faculty members.
4. No significant differences in student achievement were found in comparisons of *classes of various sizes* taught via television. Size of classes ranged from 11 to 119 students.
5. Several methods of providing for teacher-student interaction were studied in different courses. These included the use of questions and answers over an intercommunication system between the TV classrooms and originating room and the rotation of students through the TV originating room. Neither of these methods produced measurable increments in learning, but the students strongly favored the use of the intercommunication system.

Appropriateness

1. Television can be used to extend the reach of the most experienced instructors to large numbers of students, especially in introductory courses taught by the lecture-demonstration method.
2. Televised instruction can be supplemented by laboratory or discussion sections in small groups under the leadership of graduate students or selected seniors.
3. Teacher-student interaction can be achieved through the use of a two-way intercommunication system, but teachers and students must learn to use the system effectively.
4. Simple television systems can be used to magnify demonstrations in laboratories in such a way as to facilitate laboratory instruction.
5. Test questions of the conventional objective and essay types can be presented over television to large numbers of students. Television also shows promise for the presentation of lifelike problem situations for students to solve, thus opening up new dimensions of testing.

Acceptability

1. Student responses showed that on the average 78 per cent of students thought that the use of television was either a "very good" or "fairly good" means of teaching courses with large enrollments.
2. Students in TV classes ranked televised instruction first over conventional instruction in classes of 200 taught by the same instructor, or classes of 45 taught by graduate assistants.
3. In five courses, students were given instruction via television, and in face-to-face situations by the same teachers. They were then given a choice between the two methods of instruction for the remainder of the semester. On the average, students chose televised instruction six to four over face-to-face instruction by the same teacher in a large class.
4. Attitudes toward televised instruction by faculty members varied greatly. A few were quite negative toward it, some were enthusiastic, and the largest proportion appeared to be undecided or indifferent. Many faculty members had not observed televised classes.
5. Almost every semester over the eight-semester period of Penn State's experimentation with televised instruction described in this report, there was an increase in the number of courses and instructors participating in the television project.

Feasibility

1. Moderate-cost "professional" vidicon television equipment is entirely adequate for the presentation of televised instruction on a large scale. Low-cost "industrial" vidicon equipment is adequate for magnifying live demonstrations (including use of the microscope) in large auditoriums or laboratories.
2. Personnel usually found in a university can operate and maintain this equipment. Many functions can be handled by students.
3. Careful cost analyses in four well-established courses showed savings of $38,000 in one year through the use of television as compared with the usual ways of teaching these courses. Comparisons included all operating costs for television as well as depreciation of equipment.
4. Average costs per student-credit unit for the year in these four courses were reduced from $9.48 for conventional teaching to $5.44 for televised instruction.
5. It was found that the "break-even" point in relative costs was reached when 200 students were enrolled in a course. Below this figure, conventional teaching in groups of 45 students was cheaper; above it substantial savings are possible through the use of television.

Further Adaptations

Still further adaptations of television are possible at the college level. Some already are being tried that can have a significant bearing on the feasibility of televised instruction at smaller colleges and universities. A few examples may suggest what is possible.

The University of Detroit is using both closed- and open-circuit television to make the best instruction available to more students. In each case, the best qualified instructor is selected and released from other duties to concentrate on the preparation and presentation of a single course. Two forty-five-minute lectures are broadcast weekly via closed-circuit television to regular day students. They are repeated in the evening via closed-circuit television to students in the Evening Division and over open-circuit television to off-campus extension students. In addition, all students attend one fifty-minute discussion period a week.

Stephens College in Columbia, Missouri, has successfully used closed-circuit television to offer a new course in the social sciences, employing an inter-disciplinary approach and making use of distinguished visiting lecturers as well as its own faculty. This course, required of all entering students, is taught by televised lecture-demonstrations followed by small-group discussion sessions, each led by a faculty member. This year, as part of a new experiment in general education, Stephens has expanded its use of its closed-circuit system to teach portions of new courses in world literature and the humanities. Televised lessons are an aspect of another experiment at Stephens —the College House Plan—under which a faculty team teaches basic courses to a group of 100 students housed in a building that combines residential and learning facilities. Television is also used at Stephens for viewing workshops in theater performance and production as well as for presenting films in a course in child study.

In Oregon, the State Board of Higher Education is using a combination of closed-circuit systems and a low-power station to join four colleges and universities, one of them private, in a television network. Outstanding lecturers are being drawn from the three public institutions, and the telecasts are available simultaneously to students on all four campuses.

Other educational-television networks being formed will enable colleges and universities within wide geographic regions to select their best faculty members to teach courses for credit at several participating institutions. In central Texas, for instance, plans are under way to link eleven institutions in a microwave closed-circuit system, which will begin with eight courses in a number of fields. Over 500 students in eight of these institutions will be taught educational psychology by Professor Fillmore H. Sanford, chairman of the Psychology Department at the University of Texas. Other subjects include chemistry, German, visual arts, and United States history—a subject that will be taught by Professor Walter Prescott Webb, noted historian of the American West.

Through a combination of open-circuit broadcasts, microwave relays, and direct exchange of videotapes and kinescopes, colleges and universities in the Rocky Mountain and other western states will be brought into an educational-television network by the Western Interstate Commission for Higher Education. Under the direction of its Educational Television Commission, the State of Florida, which has five educational stations broadcasting school and college courses to an estimated 300,000 students, is rapidly advancing plans to create a network that will cover the entire state. The six-state region of the Upper Midwest, the State of Michigan, and the East Coast states from the Chesapeake to Maine are among other regions where educational-television networks will help promote a new pattern of cooperation in American higher education. Full implementation of such networks could be a boon to the nation's smaller colleges, which are hard put to compete with universities for their share of the country's best teaching talent. (Persons to contact for further information about particular educational-television networks are listed in Appendix I, page 75.)

In addition to support for the organization and planning of regional networks, the Ford Foundation has assisted in the activation of new channels, each of which adds another link to the potential association of colleges by television.

Reaching Students at Home

Something of a record may have been set in the fall of 1957 when New York University introduced people in the New York metropolitan area to college credits by television with "Sunrise Semester," an early-morning program on WCBS-TV. A course in comparative literature ran the full academic year, enrolled 177 students for credit the first term and 113 the second, and attracted an additional daily audience estimated to average some 100,000 persons. Now in its fourth year, with an average daily audience of 150,000, "Sunrise Semester" offers two courses each term. Its curriculum has also included such subjects as physics, sociology, psychology, the classics, and history.

A more ambitious effort is now well under way in Chicago. By broadcasting the equivalent of fifty periods, or twenty-five hours, of college instruction every week, the Chicago City Junior College has made it possible for expanded numbers of adult students to earn credits toward the Associate in Arts degree, some entirely by television. "TV College" was inaugurated over the Chicago educational station, WTTW, in the fall of 1956. Teachers drawn from the several branches of the Junior College taught four subjects over television that fall, five the following spring; an average of nine courses were taught in each of the succeeding semesters. Between 1956 and 1959—the experimental period—twenty-seven different college courses were put on the air, many of them several times. Required courses televised so far are: social science, physical science, the humanities, biology, and English composition. Other courses have been offered in mathematics, modern language, political science, psychology, literature, speech, business, science, and music.

Television students must meet the Junior College's usual entrance requirements and enroll in one of its seven branches. They must work out exercises in a study guide and mail all written assignments to a "section teacher," who corrects, grades, and mails them back. Depending on the course, the students may report to the Junior College branch where they are enrolled for a conference or examination with their section teacher five to ten times a term. Both the television teacher and the section teacher are available at scheduled hours to answer telephoned questions.

During the 1956-59 experimental period, the semester registration in "TV College" averaged 5,000 students. About one-fourth of these enrolled for credit and took about two courses each. The remainder were noncredit students who registered for about one and one-half courses each. An estimated additional audience of between 5,000 and 25,000 has continued to watch the courses daily.

How well do the students who remain through a course learn? (About 65 per cent of the television students enrolled for credit finish the course and take the examination.) An intensive research program was conducted during the three-year experimental period, involving test scores from a variety of courses. The examination scores of students taking televised courses at home were compared with the scores of day and evening students taught in conventional classes. The comparisons took into account differences in ability and previous knowledge of the subject. The results showed that the achievement of students taking courses off-campus by television was equal to, or better than, that of students in direct contact with the teacher in the classroom. Out of twenty-nine comparisons, the television students did better in ten and the classroom students did better in only one; in the eighteen remaining cases there was no significant difference in achievement. The comparisons of the achievement of the adult television students with that of evening students attending regular classes—a group more nearly equivalent in age and maturity—likewise showed either a result in favor of the television students or no significant difference.

Who were the television students? Two-thirds were women, median age in the thirties, mostly housewives who had been kept from continuing their education by home and family duties. Of both the men and women credit students, two-thirds planned to complete at least the junior-college curriculum, and about half expected to work beyond this degree. Many of the women were taking the courses to prepare themselves for careers as teachers. By 1959-60, a total of 200 students had completed the Associate in Arts degree by taking an average of half their work by television. Twenty students had completed the degree entirely by television. Among them was a housewife of thirty-four, the mother of ten children.

At the end of the experimental period, the effectiveness of "TV College" was assessed by a panel of educators. Among the significant findings that the panel felt the experiment had demonstrated were:

1. Courses at the junior-college level can be taught effectively to a home audience by television. The results of student performance were convincing and impressive.

2. The experiment has generated a healthful ferment through the junior-college system. In place of the early fears of teachers that they might be superseded by a picture tube, there has appeared a new interest in stating course objectives clearly, in using study guides in classrooms as well as for home viewers, in improving examinations, and in the experience of television teaching itself.

3. An effective classroom teacher can learn to be an effective television teacher, but adapting lessons to television requires preparation and creativity well beyond what is possible in the time usually allotted to classroom teaching.

4. The cost of educating credit students by television in the numbers registered at Chicago City Junior College is a little more than the cost of educating them in the classroom. But the performance of "TV College" should be weighed not solely against comparative costs but also against the fact that it is building an appetite in the community for higher education and

bringing back into education a new group of able students.

The Chicago Board of Education voted at the expiration of the experimental period to continue "TV College" as a regular part of the city's educational system.

In-Service Courses for Teachers

There is growing interest in the use of television to give in-service training to teachers. For two years, the Texas Education Agency (state department of education) offered an introductory course in education, broadcast by eighteen commercial-television stations, to college graduates interested in preparing for teaching careers and to liberal-arts-college graduates who had been teaching on emergency certificates in order to start them on the way to permanent certification. In 1958-59, in addition to the course offered for prospective teachers, a special series of broadcasts entitled "Texas Curriculum Studies" was offered to participants in a state-wide curriculum study. A total of 25,400 teachers and school administrators registered for this course.

In 1960-61, the Board of Education of New York City instituted a series of workshops to provide in-service training for science teachers in the elementary schools and for English teachers in the secondary schools. Weekly half-hour lecture-demonstrations over television are combined with ninety-minute workshops conducted in centers throughout the city.

The most dramatic experiment in the use of television to upgrade teachers already on the job began in the fall of 1958, when the nationwide course in modern physics was launched over the program, "Continental Classroom." The course, which was given each school day for the full academic year 1958-59, was an unprecedented effort to bring about a swift and substantial improvement in the teaching of physics in the nation's high schools. The principal teacher of the course was Dr. Harvey E. White, professor of physics at the University of

California (Berkeley). It was repeated by videotape the following year, and, meanwhile, a new course, modern chemistry, was presented by Professor John F. Baxter of the University of Florida. During the current school year, the chemistry course is being repeated, while a third course, contemporary mathematics, is being presented. The mathematics course comprises a semester of modern algebra followed by a semester of probability and statistics. Professors John L. Kelley of the University of California (Berkeley) and Frederick Mosteller of Harvard are serving as principal subject-matter specialists, respectively, during the two semesters. However, two days a week of each phase of the course are handled respectively by Dr. Julius H. Hlavaty of De Witt Clinton High School, New York City, and Professor Paul C. Clifford of Montclair State College, New Jersey. Lessons presented by the latter two teachers focus on how new concepts presented by the subject-matter specialists may be applied to classroom teaching.

"Continental Classroom" courses have enabled thousands of high-school science and mathematics teachers to bring themselves up to date in their fields. Among the program's more than 400,000 regular viewers in 1959-60, for example, were at least 35,000 high-school science teachers. Also that year, the courses were offered for credit at 300 colleges and universities. (See list Appendix II, page 80.) In addition to teachers, college students as well as adults from many walks of life have continued to enroll in the courses at the institutions participating in the program.

"Continental Classroom" is conducted by Learning Resources Institute, a nonprofit organization devoted to the application of modern technology to education. The program is sponsored by the National Broadcasting Company, and has received financial support from the Ford Foundation, the Fund for the Advancement of Education, and the following corporate sources: American Telephone and Telegraph Company, E. I. Du Pont de Nemours and Company, General Foods Fund, International Business Machines Corporation, Minnesota Mining and Manufacturing Company, Pittsburgh Plate Glass Foundation, Radio Corporation of America, Standard Oil Company (California), Union Carbide Corporation, and United States Steel Foundation.

Experience in the Schools

Even before the first results came out of the experiment at Penn State, a bold proposal was made to the Fund by the St. Louis Educational Television Commission and the St. Louis Public Schools: to offer several courses over television, without any supplementary teaching, and to have pupils receive this instruction in classes of up to 150. It was one thing to televise an entire course in college, quite another to do so in the public schools, where there was a broader range of intellectual ability among the students and, it might be assumed, a generally lower level of motivation. But if it could be done satisfactorily, the services of outstanding teachers could be spread widely.

During the 1955 fall semester, lessons in ninth-grade general science and English composition were telecast for thirty minutes a day, five days a week, through the facilities of the St. Louis community-owned station, KETC-TV. One hundred and twenty-two ninth-graders viewed the telecasts as a group in one high school; 146 did so in a second. Since neither school had classrooms that would hold such large numbers at a time, the groups met in large music rooms. One experienced teacher was in each room to receive assignments and meet any unforeseen occurrences—but not to teach in the usual sense of the word. She was assisted by a college graduate who was not a professional teacher.

Lessons in second-grade spelling were telecast for two semesters in the spring and fall of 1956. These were presented twenty minutes a day, five days a week, and the children watched them in classes of seventy and ninety-eight, seated at lunchroom tables in two elementary schools. Again an experienced teacher was in charge of each room but did not teach. Here she was aided by a retired elementary-school teacher.

How did the television students fare? In general science, they did as well as a comparable group of students taught in the conventional manner. In English composition, there was a suggestion that they made slightly greater gains. In second-grade spelling, a difference favored the control students; the two groups did equally well in a test of second-grade words, but when they were tested on words considered above the usual second-grade level, the conventionally taught students did better than those in the experiment. The report of these findings included a suggestion that the difference in the spelling test results might be explained by the fact that large-group television teaching must of necessity be geared to one level of instruction.

The results of the St. Louis experiment also suggested that televised instruction could not do the whole educational job, and the major interest thereafter turned toward a combination of televised instruction and some "follow-up" instruction by the teacher present in the classroom.

The Pittsburgh Program

At the same time the St. Louis experiment began, another venture was launched in Pittsburgh. Its purpose was to raise the quality of teaching in the local schools simply by selecting outstanding teachers, freeing them from all other duties so they could prepare their lessons with great care, and presenting their teaching every day over the open-circuit facilities of community-owned WQED-TV. Grade-school children, and later high-school students, viewed these telecasts in classes of conventional size, averaging about thirty-five pupils to a room. Their regular teachers were in attendance and supplemented the telecasts with their own "follow-up" instruction—directing drill, practice, and review; answering questions; maintaining the back-and-forth of class discussion; helping individual students; and otherwise carrying the teaching process beyond the televised presentations.

The Pittsburgh television experiment tried from the outset to improve the quality of teaching not only by putting superior teachers on television but by offering courses that otherwise could not have been offered under conventional arrangements, such as conversational French at the elementary-school level.

With its emphasis on studio teachers of high quality, it was a logical extension of the Pittsburgh approach to reach beyond local resources in the selection of teachers, and in 1956 Harvey E. White was invited to develop a new high-school physics course and present it over WQED. (In March, 1959, a second community-owned educational-television station in Pittsburgh, WQEX, also began broadcasting to the schools.) Encyclopaedia Britannica Films, Inc., filmed the entire course of 162 half-hour lessons in color and in black and white as they were presented, and now offers the film for sale to any school or school system for use as a film or a television presentation. It is estimated that 140,000 students in 700 school systems throughout the country have received instruction in physics by way of the White film.

In 1956-57, televised instruction was offered in fifth-grade arithmetic, reading, social studies, and French, and in high-school physics. Tests were administered (in all subjects but French) to several television classes and several conventional classes. As in St. Louis, no very exact comparison of the two groups was possible, and there were many variations on how individual classes in each group were taught. It was thus impossible to conclude from the results that either method was superior to the other—either regular classroom teaching or televised teaching supplemented by classroom work. However, the finding of wide variations of achievement among rather comparable classes of students within the two groups apparently suggests that the effectiveness of the televised lessons depended to an important degree on the quality of the "follow-up" by the teachers in the classrooms.

The program not only continues today but has been accepted to a notable degree by the parochial as well as the public schools of the Pittsburgh metropolitan area. In 1960-61, nine full courses and twenty-eight supplemental courses are being televised. A total of 125,000 students in 437 schools are taking one or more of these thirty-seven courses. Among the full courses are two that were produced outside the Pittsburgh schools and that provide superior instruction in foreign languages at the elementary level: beginning Spanish, produced by the Denver Public Schools, and beginning French, produced by the Modern Language Project, Massachusetts Council for Public Schools. The latter course, *Parlons Français*, originally broadcast to schools in the Boston area over WGBH, is now being taught to two million pupils throughout the country.

The Alabama Program

Quite similar to the Pittsburgh program in its operation so far has been Alabama's state-wide program in televised instruction for the schools. Its aim is to raise the standard of teaching in elementary and secondary schools throughout the state. It has at its disposal not one television station but a network of three, the first state-wide network of open-circuit educational-television stations to be established.

During the 1960-61 school year, thirteen courses are being broadcast, including Alabama history, biology, chemistry, science, mathematics, and Spanish. Additional lessons in reading, music, art, American history, and nature study are presented as supplementary instruction or enrichment. Study guides go out to the participating schools well in advance, offering classroom teachers suggestions for activities to follow the telecasts, including questions to discuss and laboratory work for the students to do.

There is growing evidence that this service is enabling schools not only to offer better teaching but to offer courses they could not have offered otherwise. There is also evidence that the service is being used by a substantial number of teachers who could not possibly provide adequate instruction without some such assistance as the program provides.

The number of schools making use of the Alabama program has been expanding steadily. When the program began in the fall of 1957, only 100 of the 1,000 schools in the network's reception area reported having even a single television set. By the spring of 1958, more than 100 schools were making regular and continuous use of the network's services, and in the 1960-61 school year more than 300,000 students in 600 schools throughout the state receive daily instruction over the Alabama ETV network.

The Chelsea Project

In the heart of New York City, closed-circuit television is being used to attack a uniquely different kind of educational problem—the problem of helping newcomers to these shores make a more effective adjustment to the American culture. This experiment, known as the Chelsea Project, has two main objectives: (a) the attainment of a closer relationship between school and community, and (b) raising the educational and cultural sights of an entire neighborhood. Locus of the experiment is a low-income housing development whose residents comprise three primary ethnic groups in roughly equal numbers—whites, Negroes, and Spanish-speaking people of Latin American and Puerto Rican origin.

Within the development are located a public school, a settlement house, and a municipal health center. All three are linked by coaxial cable with the apartment buildings of the housing project. From the school emanate televised courses in English, Spanish, elementary science, music, speech improvement, health instruction, and other subjects. These televised courses, broadcast during school hours, are available to students in the classroom and to parents in the home. During the evening hours, special programs of interest to residents of the neighborhood are broadcast from the health center and the settlement house.

Begun in the fall of 1957, the project is now in its fourth year. Its sponsors—the New York City Board of Education, Hudson Guild Neighborhood House, and Language Research Inc., of Harvard University—hope that ultimately it will bring the school, the home, and the community closer together and help to re-establish channels of communication that are too often lost or forgotten in the heterogeneous urban culture of large cities.

Washington County, Maryland

The largest single experiment in the use of classroom television in a school district was launched in the fall of 1956 in Hagerstown, Maryland, county seat of Washington County. This experiment undertook to answer the question of whether the new medium could be used as a resource to provide the 18,000 students in the county schools a richer education, and at less cost, than was possible by conventional methods of instruction.

The Washington County experiment was significant in what it set out to do, and it gained in importance from the wide attention it attracted from the very beginning. Thousands of educators and lay people have visited Hagerstown to observe the experiment in action. To many of these—school-board members, superintendents, principals, teachers, and college and university teachers of students preparing for teaching careers—Hagerstown has provided an important test of whether teaching by television can be superior to the teaching common to most classrooms.

Several features set the experiment apart from those that had gone before. Some classes were much larger than usual—up to four times the county average of thirty-two pupils. Efforts were made to find the best means of making use of the telecasts in the classrooms and to develop the classroom teachers and the studio teachers into effective teaching teams. Beyond this, Washington County set out to explore the full potential of television in the service of a school system. The experiment therefore involved more of everything—more televised lessons, a broader range of subjects, and more schools, teachers, and pupils than any previous experiment. (See the table on the opposite page for a list of subjects being taught by television this year.) To make this possible, it was decided to use not the open-circuit method, as in Pittsburgh and St. Louis, but a closed-circuit system. This too was by way of experimenting, for although the closed-circuit system had been used within a single building, or to connect adjoining buildings in colleges and universities, here it was to connect the fifty schools of a county system, spread over 462 square miles.

A closed-circuit system has certain advantages for a school system. At present, for example, an open-circuit station is limited to a single channel, which means it can transmit no more than one program or lesson at a time; over the coaxial cable of a closed-circuit system several different lessons can be transmitted at the same time. In Hagerstown, six channels can be used simultaneously. The Hagerstown experiment was intended to discover, among other things, whether the cost of closed-circuit television over moderately long distances was economically feasible so that any school system could have its own television operation and could encompass in its televised instruction program a wide selection of the courses in its curriculum from the first through the twelfth grades.

In the fall of 1956, instruction in ten subjects went out from the "television center" (a corrugated metal shed that was once the school system's agricultural shop) to 4,941 students in eight schools in Hagerstown. By the fall of 1957—one year later—instruction in twenty-one subjects was being televised, and the network of coaxial cable reached out to some 9,781 students in twenty-two schools. In 1960, thirty-six of the fifty Washington County schools, with a total enrollment of 16,500 students, were joined in the network. It is expected that the entire county school system will eventually be included.

Long before all this had begun, however, the Hagerstown school authorities set out to overcome the fear voiced by some critics that television would reduce the classroom teacher to

SUBJECTS TAUGHT BY TELEVISION IN WASHINGTON COUNTY, MARYLAND

(School Year, 1960-61)

Grade	Subjects
First:	Arithmetic, Art, Music, Reading, Science
Second:	Arithmetic, Art, Music, Reading, Science
Third:	Arithmetic, Art, Music, Reading, Science, Social Studies
Fourth:	Arithmetic, Art, Conversational French, Music, Reading, Social Studies
Fifth:	Arithmetic, Art, Conversational French, Music, Reading, Social Studies
Sixth:	Arithmetic, Art, Conversational French, Music, Practical Arts, Reading
Seventh:	Conversational French, Core Studies, Guidance, Mathematics, Music, Practical Arts, Science
Eighth:	Core Studies, Guidance, Mathematics, Music, Practical Arts, Science
Ninth:	Biology, Guidance, Music
Tenth:	Geometry, Guidance, Music
Eleventh:	Chemistry, Guidance, Music, U. S. History
Twelfth:	English, Guidance, Mathematics, Music, Physics

the status of a monitor. Fortunately, the teachers in this school system had long played an active role in planning the curriculum. A restudy of the curriculum had been undertaken eight years earlier, involving every teacher in the county. Questionnaires polled them on what they thought was good and bad in the instructional program. Then there were statements of policy, notebooks in which the teachers could record their ideas, summer workshops for six years, and other workshops between semesters. By the time the television experiment began, there was a general understanding among the teachers as to what was to be accomplished in each subject in each grade.

During the summer of 1956, a workshop of teachers and supervisors planned the main lines of the first year's televised courses. The learning process was analyzed in some detail, in an effort to make clear from the beginning just which functions could be performed better by the studio teacher and which ones by the teachers in the classrooms. Generally speaking, the workshop concluded that the studio teacher would be in the better position to stimulate interest, to inform by word and demonstration, to show applications of general concepts, to raise questions, and to challenge pupils to assume more responsibility for their own learning. The classroom teacher, on the other hand, was thought better able to handle classroom discussion, to care for the individual differences in pupils, clear up immediate misunderstandings, supervise drill and problem-solving sessions, provide remedial teaching, help the pupil establish relationships between things learned and his daily activities, provide opportunities for pupils to exercise critical judgments, interpret the testing program, and give attention to the establishment of desirable habits and traits.

For each subject to be included in the television program, general outlines were developed by the classroom teachers and the teacher selected to serve in the studio. After telecasting began, daily "feed-back" sheets, regular meetings through the school year, and workshops in the summer have kept the classroom teachers in close contact with the studio teachers and have brought the lesson plans under regular review. By these means, the Hagerstown school authorities believe they have not only removed fear of displacement from the minds of their classroom teachers but have gone some distance in developing the concept of team teaching. (See page 12.)

Has the teaching been improved? Hagerstown school officials believe that it has, in several ways, and preliminary test results bear out this belief. The art and music lessons by teachers who have specialized in these fields are new to Hagerstown; classroom teachers readily acknowledge that the lessons are superior to what they could do themselves, and want the program continued. There is also general agreement that the elementary-science program has been improved substantially.

School authorities, concerned about the general level of achievement in arithmetic, were particularly interested in the results of televised instruction in this subject. Pupil achievement was measured by the Iowa Tests of Basic Skills, a nationally known test used in many school systems. The results obtained over several years' time showed striking progress in arithmetic learning in the television classes at all levels of ability in comparison with the period before television was used, as well as in relation to both nontelevision students and the standard national norms.

Before televised instruction in arithmetic, less than 20 per cent of the sixth-grade students in the Hagerstown schools reached eighth-grade achievement in this subject. In one group of schools, after one year of televised instruction, the sixth graders who reached the eighth-grade level or higher more than doubled, rising to 33 per cent. After three years of television, 41 per cent of the sixth graders were at or above the eighth-grade level in arithmetic. In another group of schools, the growth was equally impressive. After one year of televised instruction in arithmetic, the percentage of students reaching the eighth-grade level also doubled, increasing from 11 per cent to 22 per cent, and after two years, it rose to 28 per cent.

In 1957-58, before fifth graders in Washington County schools outside Hagerstown were taught by television, the median score of these students in arithmetic was higher than median scores made in 20 per cent of the nation's schools using the Iowa test. After one year of arithmetic by television, the median score was higher than 52 per cent of the nation's schools using the Iowa test, and after two years—in 1959-60—the Washington County students surpassed 85 per cent of these schools.

Because of these achievements, Washington County has upgraded its arithmetic curriculum and added to the regular high-school program an advanced mathematics course that was formerly optional and taught outside school hours.

Classroom teachers have stated that they find the televised lessons stimulating, because the studio teacher, free of all other duties, has been able to prepare the lessons more carefully and has been able to devise many visual materials to illustrate abstract ideas. This attitude has become especially true among teachers who are new, or new in the grade they are teaching. After a while, some of them come to believe they could do as well themselves, and to some extent their superiors seem to agree with them. Supervisors and principals have said that they have seen many teachers adopt better practices learned from their colleagues teaching over television.

It is in the secondary schools that Hagerstown has introduced its first large classes, and the largest have been tried in the junior high schools. Televised lessons have been viewed by classes of 120 to 140 students in auditoriums, cafeterias, and large classrooms. In these classes, in which mathematics, science, and "core" studies (a combination of social studies and English) are taught, about half the instruction time in each subject is taken up by the telecast. One teacher is with the large class during this time. During the day, this teacher meets with the pupils for a second full period, in groups of twenty-five to thirty, for practice and drill, quizzes, class projects, and individual guidance and direction.

The classes in the senior high schools, while not so large as those in the junior high schools, represent a greater innovation, for the entire instruction in a subject is given in the large group. Classes of up to ninety-one students have been organ-

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In 1957-58, before fifth graders in Washington County schools outside Hagerstown were taught by television, the median score of these students in arithmetic was higher than ized in such subjects as tenth-grade plane geometry and eleventh-grade United States history. The classes are homogeneous in the sense that the range in ability among the students in any one class is not great—a fact that has made easier the problem of dealing with individual differences. The telecasts are aimed at the average student; each classroom teacher supplements them in a way suited for her particular class.

To manage the larger classes, teachers have organized them into groups of fifteen to twenty students, each clustered before a television set in a large study hall, and each with a "chairman-recorder" and an "engineer" elected by the group. The "chairman" records attendance, distributes and collects materials, and performs other assignments made by the teacher. The "engineer" adjusts the television set before, during, and at the end of the telecast.

Many teachers and administrators in Hagerstown believe this combination of the better organized, well-presented instruction of the studio teacher and the skillful guidance of the better classroom teachers is an improvement over conventional methods. However, they recognize that no final judgments are possible until the five-year experiment has been completed.

Appraisal of the Washington County experiment also will take into account the question of whether the special costs of closed-circuit televised instruction can be met without special increases in the school budget. These costs will not be inconsiderable, even though Hagerstown has received assistance that other school systems cannot expect. Manufacturers of television equipment, through the Radio, Electronics, and Television Manufacturers Association (now the Electronics Industries Association), have so far contributed most of the equipment in use; this is estimated to have a wholesale value of $300,000. The Chesapeake and Potomac Telephone Company has installed over eighty miles of cable and related equipment valued at more than $500,000. The Fund for the Advancement of Education and the Ford Foundation have provided about $974,000 so far to meet special costs of staffing and evaluating the experiment.

After the end of the experiment (now in its fifth and final year), money must be budgeted annually for salaries and administrative expenses of the special television staff—twenty-five studio teachers, three administrators and five clerks, six engineers and others in operations, and fourteen full-time and eighteen more part-time persons in production—a total staff of seventy-one persons. There is also an unknown in the equation: the cost of signal transmission. The closed-circuit system makes use of coaxial cable laid free of charge by the Chesapeake and Potomac Telephone Company. Use of the cable was provided free during the first two years; negotiations are now under way to establish a yearly rental fee.

Hagerstown school officials believe that if the total cost of operations and transmission can be held below $350,000 per year, it may be possible to meet the costs of their new method of instruction through savings in the teaching staff, in instructional equipment, and in the more efficient use of classroom space.

So far, the clearest saving in staff time has been in the junior high schools, where seven fewer teachers than would otherwise be needed have been used with the 1,500 boys and girls enrolled in the large classes. This saving in staff time has been used to reduce the student-teacher ratio in other classes. A different kind of saving has been effected in the elementary-school program, where art and music were added to the curriculum through the use of only three teachers and the half time of a fourth. To have done this without television would have required thirty-four teachers. In terms of teacher salaries, $171,600 in instructional benefits was obtained for $17,680.

The National Program in the Use of Television in the Public Schools

The main thesis of *Schools for Tomorrow,* a report by Alexander J. Stoddard that the Fund published early in 1957, was that television could be used as a powerful resource for the teaching of very large classes. The report contended that such an arrangement could bring about substantial savings in classroom space and in teaching positions while at the same time improving the quality of education.

Following the publication of this report, Fund representatives raised with a number of superintendents, particularly in large cities, the question of whether they would be interested in testing these hypotheses. Out of these conversations grew the National Program in the Use of Television in the Public Schools, a nationwide experiment that began in 1957-58 with nearly 40,000 students in more than 200 elementary and secondary schools.

Participating in the first year of the National Program were the public-school systems of Atlanta; Cincinnati; Dade County (Miami), Florida; Detroit; Jefferson County, Kentucky; Milwaukee; Norfolk; Oklahoma City; Philadelphia; and Wichita, as well as scores of other school systems in Nebraska, North Carolina, and Oklahoma. With the exception of Cincinnati, the school systems of these cities and regions have continued in the Program, which entered its fourth year in 1960-61. In addition, the Program now includes Anaheim, California; Buena Vista No. 9 School District, Saginaw, Michigan; central Michigan; the Columbus, Ohio, area; Evansville and vicinity; Des Moines; western Florida; and Kansas City, Missouri. Altogether, close to 200,000 students in nearly 800 schools in fifteen municipal areas and eight regions are participating in the Program.

In many ways, these school systems are representative of the nation's public schools. First, they are scattered over a wide geographic area, representing every major section of the country. Second, the schools they embrace range from small rural high schools in Nebraska and Oklahoma enrolling fewer than a hundred students to big city schools in Detroit and Philadelphia enrolling several thousand students. Third, these schools enroll students from a wide variety of socio-economic and racial backgrounds, possessing a broad range of abilities and interests, and the schools are staffed by teachers with a similarly wide variety of backgrounds and levels of competency. Finally, the school buildings themselves differ widely in terms of age, location, and adequacy of facilities. Some are new suburban schools equipped with all the modern appurtenances of education, and others are aging, dilapidated urban schools with the most rudimentary facilities.

Objectives: The major objective of the National Program is, as has been suggested, to determine whether it is feasible, using televised instruction as a major resource, to teach large classes of students with fewer teachers and fewer classrooms than might otherwise be required, and at the same time to upgrade the quality of education. It is hoped that the experiment also will provide evidence on these related matters:

1. The kind and amount of services other than televised instruction needed to establish optimum conditions for learning.
2. The scheduling and school-building problems involved in teaching large classes by television, and whether or not these problems can be met at low cost and without sacrificing quality in instruction.
3. The budgetary implications—both capital and operating—of the savings in teacher time, in building space, in equipment, and in other items of educational cost.
4. How best to develop teacher talent, not only for television but also for teaching larger classes in regular classrooms.

The National Program also has other aspects and objectives. For example, a major problem in American public education is the existence of large numbers of small rural high schools that, because of their size, are not adequately staffed to provide the kind of education their students need and are entitled to as members of a democracy dedicated to the ideal of equal educational opportunities for all its boys and girls. An accident of geography deprives thousands of students in these small schools of the opportunity to take courses that are readily available to their city cousins. In many of these small schools—and there are several thousand of them across the land—such courses as algebra, geometry, physics, chemistry, and foreign languages are either not taught at all or are taught poorly by overworked and underpaid teachers who are not adequately prepared in the subject.

For many years, educators have been pressing for consolidation of these schools into units of sufficient size to be able to teach a full high-school curriculum adequately. This movement has had substantial success, and the number of small rural high schools has been steadily reduced, but the facts of geography indicate that there is a limit to the feasibility of consolidation. Even in a modern school bus, there are distances and terrain over which it is not reasonable to expect a student to travel every school day, in all kinds of weather and over all kinds of roads.

Might not there be other ways of enriching the educational program of these rural students?

Two of the experiments in the National Program are seeking answers to this question. In Nebraska, where the *median*-size high school has only five teachers and sixty-five students, teachers from the University of Nebraska used a combination of televised instruction and correspondence materials to bring courses in algebra, geometry, physics, English, and Spanish to students in some twenty-five small rural high schools within a forty-mile radius of KUON, the educational-television station in Lincoln. For example, six students in the high school at Beaver Crossing took physics from one of the best physics teachers in the country—Dr. Harvey White. Eight more took the same course at the high school in Wahoo Luther, while eleven students studied Spanish and art over television at the high school in Weeping Water.

The same effort to bring high-quality instruction to rural students was made in the State of Oklahoma, except that correspondence-course materials were not used to supplement the televised instruction. Courses taught in the Oklahoma experiment during the first two years included second-year algebra, chemistry, geology, physics, and solid geometry. The televised instruction in these courses originated from Oklahoma City and was also received by students in Oklahoma City high schools. This meant, for example, that students in the rural high schools of Mustang and Crooked Oak received the same televised instruction as the students in Capitol Hill High School in Oklahoma City.

No effort will be made here to describe in detail each experiment in the National Program.[1] As might be expected in a program involving some 200 different school systems and more than a score of different courses ranging from third-grade conversational Spanish to twelfth-grade physics, practices vary widely. However, what follows is an attempt to present an over-all picture of how the National Program in the Use of Television in the Public Schools operated in its first two years, taking account of exceptions to the general pattern.

Advance Planning: In the summer of 1957, before the experiments got under way, workshops were held to plan in detail the courses to be televised. Participating in these workshops were the studio teachers and the classroom teachers who were to be involved in the experiments. (Exceptions in this case were the Nebraska and Oklahoma state experiments, where it was not feasible to bring together all the teachers in the rural schools scheduled to receive the telecasts.) In most cases, these workshops developed course outlines, as well as guides for the classroom teachers and, in several instances, guides for the students as well. These workshops proved to be of inestimable value, because in most instances they resulted in courses that were far better prepared than had been true of the same courses in previous years. As a general rule, outside consultants were brought in to offer advice on such matters as curriculum planning and techniques of television teaching. (Such workshops were held again in preparation for the second and third years.)

Physical Facilities: Since today's schools were not designed for television teaching—especially in large classes—one of the major problems confronting the schools participating in the

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[1] Multilithed copies of a detailed report on the second year of the National Program can be obtained without cost by writing to the Fund for the Advancement of Education, 477 Madison Avenue, New York 22, N. Y.

National Program was how to make provision for classes that were five, ten, or even twenty times the size of conventional classes. This problem was met in various ways. One of the most obvious solutions was to use the school auditorium, which is usually vacant during most of the school day. This approach was the one most commonly used. Some schools were fortunate enough to have fairly modern auditoriums, which could be converted into television classrooms quite readily, but others had to make do with auditoriums where the acoustics were bad, where the television receiver sets had to be spaced at awkward intervals, and where the seating arrangements left much to be desired, especially when it was necessary for students in one course to make way for students in the next course in a matter of a few minutes. (It should be noted here that there were exceptions to this problem. Visitors to one school in Miami were quite impressed to see an auditorium containing more than 300 students emptied and refilled in two or three minutes, with a minimum of confusion. What made the feat more remarkable was that the students were adolescent eighth-graders.) Lighting in the auditoriums was not much of a problem, since it is not necessary to dim the lights as much for television reception as it is for motion-picture reception. One universal problem with auditoriums, however, was that the armrests were not wide enough for the students to use in taking notes. Several makeshift arrangements were called into play. In some schools, the students were equipped with lapboards, and in others students used their own ingenuity and came equipped with hard-cover notebooks.

Another obvious solution to the problem of finding space for large classes was to use the school cafeteria, which, like the auditorium, is vacant during most of the school day. This approach had its advantages and its disadvantages. On the plus side, the cafeteria tables offered the students a solid surface on which they could rest their notebooks. The tables also made it possible to arrange students into small groups, and in one school this advantage was seized upon to form forty discussion groups in a class of 200, thereby making possible the equivalent of small seminars in the "follow-up" to the telecast part of the lesson. The major disadvantages of cafeterias as large classrooms were that noises—and odors—from the kitchen were often distracting, and that television receiving sets usually had to be ranged along the walls, which sometimes made for rather odd seating arrangements.

Other approaches to the space problem were tried. Some schools used large study halls, which proved generally satisfactory because they provided desks for the students and permitted a systematic arrangement of the television receiving sets. In other cases, less acceptable arrangements had to be employed. One elementary school, for example, put two portable buildings together to form its large television classroom. This was decidedly not a happy arrangement, but the classroom teacher responded heroically to the situation, and that particular class was mentioned favorably by many people who visited various schools in the National Program.

Class Size: The principal characteristic of all the experiments except the Nebraska and Oklahoma state projects was the large class. At the elementary level, the television classes ranged in size up to 175. At the junior- and senior-high level, they were much larger, ranging in size from 200 to 500.

Most of the elementary schools in the Program were reorganized along the lines of a plan suggested in *Schools for Tomorrow*. Under this plan, students spent half the day in a class of twenty-five students or less, receiving instruction in reading, writing, and arithmetic from a single teacher; the other half of the day they spent in groups of 75 to 150, with a series of teachers, receiving instruction in social studies, science, physical education, health, safety, and other subjects. It was in these larger groups that elementary students in the experiment received part of their instruction over television.

In the junior and senior high schools, the large classes were generally in courses such as history, English, mathematics, physics, and chemistry.

How the Courses Were Taught: In courses in the elementary schools, the classroom teacher usually had about five minutes before the telecast to prepare the students for what they were about to see and hear; the studio teacher then presented the main points of the lesson in a twenty-minute telecast; the classroom teacher then answered questions, stimulated discussion about the points made by the studio teacher, and (depending upon such variables as the general ability level of the class or the complexity of the subject matter that had been presented in the telecast) either reinforced the main points of the lesson or carried the students much beyond what had been presented. Sometimes, of course, a classroom teacher did both. The teacher guides that had been prepared in the summer workshops often contained suggestions for what the classroom teacher might do in the "follow-up" part of the lesson, and in those instances where student guides also had been prepared there were suggestions as to what the student might do on his own to follow up the main points of the lesson.

In courses in the junior and senior high schools, much the same procedure was followed, except that there was much wider variation in the timing of the "follow-up" period. Practice varied so widely that few generalizations are possible, except to say that the televised portion of the lesson was usually about thirty minutes, and the "follow-up" about twenty to twenty-five. Schedules varied so widely that in some instances the "follow-up" came before the telecast, in others it came afterward, and in still others it was divided.

It was customary to have one or more regular classroom teachers present in the viewing room during the entire lesson. In some instances, one classroom teacher handled the entire class. This was most often true at the elementary level. At the junior-high and senior-high levels, the general practice depended a great deal upon subject matter, scheduling, and the size of the class. In some cases, one regular teacher in the particular subject matter of the course (for example, an English teacher) handled the entire class with the assistance of an aide, who took attendance, passed out papers, and performed other nonprofessional chores. In other cases, depending largely on the size of the class, two teachers in the particular subject matter were assigned to the class. In still other cases—as when, for example, a class in English was to be followed by a class in history in the same large room—a teacher from each subject-matter area was assigned to both classes. The English teacher would handle the "follow-up" teaching in her course, assisted by the history teacher, and during the history course the roles of the two teachers would be reversed.

Finally, it should be emphasized that no student in the experiment received all of his instruction over television. Even in the Nebraska and Oklahoma experiments, where often there was no teacher present in the viewing room, the televised instruction received by each student represented only a small proportion of the total amount of instruction he received in all classes during the school day.

Evaluation: To assist the participating school systems and the Fund in evaluating the Program, two committees of educators and testing experts were established. The first, known as the Appraisal Committee, was headed by Herold C. Hunt, Eliot Professor of Education at the Harvard Graduate School of Education, and was charged with the responsibility of appraising such things as the quality of instruction, techniques and procedures of teaching large classes, the physical arrangements of the large classes, scheduling problems, and so forth. The second committee, known as the Evaluation Committee, was headed by Arthur E. Traxler, Executive Director of the Educational Records Bureau, and was responsible for advising the participating school systems in the testing of student achievement and attitudes.

There was naturally wide variation among the different school systems in the kind and quality of the tests used and in the statistical treatment of the test results. Some schools matched experimental and control groups pupil for pupil, others matched on the basis of means and standard deviations of experimental and control groups, and still others took differences between the groups into account through analysis of covariants (the procedure favored by the Evaluation Committee).

Although testing and statistical procedures varied widely, *the results presented below are based only on comparisons in which the television and control students had been equated on the basis of scholastic aptitude and pre-test score, or in which differences between television and control groups had been taken into account in such a way that legitimate comparisons could be made.*

Test Results: Despite the newness of television as a medium of instruction, all sorts of technical difficulties, and the makeshift arrangements required to convert auditoriums, cafeterias, large study halls, and portable buildings into classrooms, the test results clearly showed that students who received part of their instruction over television in large classes did as well as—and in many cases significantly better than—students who were taught by conventional methods in small classes.

The results of 251 comparisons cited on pages 8 and 9 are repeated here: 165 comparisons favored the TV students and eighty-six favored the control students. There were ninety cases where the difference in achievement was statistically significant; in sixty-nine of these the difference was in favor of the TV classes, and in twenty-one it was in favor of the control classes.

The tables on pages 62 and 63 summarize the results of the comparisons by school systems for each of the two years they include.

Other Results: Reports from the school systems participating in the National Program indicated that other encouraging results emerged from the first two years' experience. For example:

1. The use of television as a medium of instruction in many instances brought about a re-thinking of the curriculum and course objectives.

TEST RESULTS FROM SCHOOL
NATIONAL PROGRAM IN THE USE OF

COMPARISONS FOR 1957-58

	N	In Favor of TV Classes	N	In Favor of Control Classes
Atlanta	2,367	10(6)	2,512	5(2)
Cincinnati	672	5(1)	672	3(0)
Dade County, Fla.	1,856	12(5)	1,435	10(2)
Detroit	1,897	10(6)	1,738	4(1)
Jefferson County, Ky.	1,104	3(2)	1,584	1(0)
Milwaukee	950	2(1)	623	1(0)
Nebraska	568	3(0)	995	4(1)
Norfolk	810	8(5)	850	3(2)
North Carolina	981	3(2)	981	1(0)
Oklahoma City	359	3(0)	284	5(1)
Philadelphia	2,391	9(1)	2,391	5(0)
Totals	14,326	68(29)	12,666	42(9)

"N" signifies the number of TV and control students involved in the comparisons.

Numbers in parentheses indicate cases where the difference in achievement was statistically significant.

2. By bringing superior teaching to the attention of a great many classroom teachers, television proved to be a valuable means of improving the in-service training of teachers.

3. Because of the careful planning that went into televised courses, in many cases they proved much better organized than conventional courses, and the television teachers found they could cover much more ground—and in less time—than they could by conventional methods.

4. Television brought into the classroom far richer educational experiences than had been possible before. (In Phila-

SYSTEMS PARTICIPATING IN THE TELEVISION IN THE PUBLIC SCHOOLS

COMPARISONS FOR 1958-59

	N	In Favor of TV Classes	N	In Favor of Control Classes
Atlanta	5,828	18(11)	3,307	12(4)
Dade County, Fla.	710	13(3)	530	6(0)
Detroit	2,442	9(3)	1,722	5(2)
Jefferson County, Ky.[1]	3,906	5(3)	3,834	4(2)
Kentuckiana[2]	6,455	2(1)	1,725	2(0)
Kansas City, Mo.	793	7(5)	513	0
Milwaukee	1,301	4(3)	932	0
Nebraska	261	3(2)	444	6(2)
Norfolk	617	6(2)	576	3(1)
North Carolina	8,000	3(2)	4,595	0
Oklahoma City	391	6(1)	296	1(1)
Philadelphia	5,262	8(4)	5,262	2(0)
Southwestern Indiana[3]	7,139	13(0)	2,356	3(0)
Totals	43,105	97(40)	26,092	44(12)

[1] Closed-circuit television.
[2] Jefferson County, Ky., and vicinity; open-circuit television.
[3] Evansville and vicinity

delphia, for example, the chairman of the U.S. Committee on the International Geophysical Year spoke to several thousand science students on the meaning and significance of the IGY. In several other cities, rare treasures from museums of art and history were shown to the students over television.)

5. Since all but one of the projects used open-circuit television, the studio teachers had a much wider audience than the students in the classrooms. They found that other school systems were tuning in on their broadcasts and that parents were watching regularly.

6. Much to the surprise of some observers, school librarians reported that the TV students—stimulated by provocative teaching—were making much more extensive use of the library than other students.

7. Several school systems reported substantial savings in teaching positions and in classroom space—with no sacrifice of quality. Dade County, for example, saved the equivalent of twenty-seven teaching positions and twenty-nine classrooms. In other cities, the teacher time saved by the use of television in large classes made it possible to provide much more individualized instruction for slow learners and rapid learners.

8. Tardiness and absences fell off sharply among students in the television classes.

9. Except in a few isolated cases, discipline was not a problem in the large classes.

10. The techniques of teaching and learning in large-class situations have by no means been thoroughly mastered, but the classroom teachers and the students worked hard during the first two years to develop and improve them. Classroom teachers, far from being relegated to a minor role, assumed a new importance, particularly in the large classes. They experimented with various ways of eliciting student participation, both during and after the televised part of the lesson, and they helped students to develop the skills of note-taking and of speaking clearly and distinctly.

Problems: As might be expected, the school systems participating in the National Program encountered many problems during the first two years. Many of these problems had already been encountered in earlier experiments. Some were solved fairly quickly. In general, however, these were the problems that remained only partially solved as the Program entered its third year:

1. *The problem of inadequate facilities.* As has been indicated earlier in this report, this was the major problem faced by most of the participating school systems. Auditoriums and cafeterias were not designed for use as classrooms, and they

were far from ideal when used for the large television classes. Several school systems, on the basis of their experience during the first year, made alterations to these large rooms in an effort to improve them for classroom use during the 1958-59 school year.

2. *The problem of finding, recruiting, and training studio teachers.* Generally speaking, good classroom teachers make good television teachers, but there are special techniques any teacher must master in using television as a medium of instruction.

3. *The problem of training classroom teachers in the techniques of handling large classes, particularly in the techniques of eliciting student participation.* Discipline has not been a problem in the large classes, but student participation in a large class must of necessity take different forms than is customary in a small class. Several imaginative teachers in the large classes have devised new techniques for stimulating student discussion and involvement after the telecast part of the lesson, but much remains to be learned in this respect.

4. *Students, too, need to learn the techniques of learning in a large-class situation.* Here again, much remains to be learned about the nature of student participation and the various forms it can take.

5. *The problem of integrating the telecast part of the lesson and the classroom "follow-up" into a unified, meaningful whole.* This involves the whole question of the role of the studio teacher and the role of the classroom teacher as members of a teaching team—a question that needs much fuller exploration.

6. *The problem of reorganizing the curriculum to take maximum advantage of television as a teaching tool.* On the basis of the first two years' experience, the participating school systems are convinced that the new medium makes possible a much broader, deeper, and richer curriculum than is possible under conventional methods of instruction. The problem is to develop a curriculum that fully utilizes the potentialities of the new medium.

7. *The problem of adapting the new technique of teaching*

by television to the varying abilities of students. This also is a problem in conventional instruction, but it becomes increasingly important when a television teacher reaches several hundred, or several thousand, students in widely scattered classrooms.

8. *The problems of scheduling, with respect to the time of day the lesson is telecast and also with respect to the duration of the telecast and its place in the class period.* The latter aspect of the problem has important implications for the problem of integrating the telecast and the classroom "follow-up" into a meaningful whole.

9. *Finally, there is the never-ending problem of quality.* Television is essentially neutral as a conveyor of ideas, concepts, and information. The quality of the output can only be as good as the quality of the input. A mediocre teacher on television communicates her mediocrity to a much wider audience than a mediocre teacher in a classroom. Generally speaking, the quality of the television teaching in the National Program has been excellent, but the studio teachers themselves are constantly working to make it even better.

A Look Ahead

Today the question is no longer *whether* television can play an important role in education. That question has been answered in the affirmative not only by the experiments supported by the Fund and the Foundation but also by the many other programs in which the medium is being used successfully for direct classroom instruction. The question that now needs fuller exploration is *what kind* of role television can play most effectively.

Under the provisions of the National Defense Education Act of 1958, the Congress of the United States made available a substantial sum of money for experimentation by schools and colleges in the more effective use of television, radio, motion pictures, and related media for educational purposes. This Act, which is generally regarded as a major landmark in Federal assistance to education, has opened up many new avenues of exploration into the potential role of television and related media of communication in improving the quality of education in the United States.

Other new developments during the past few years also point the way toward wider use of television as a medium of instruction. The New York State Regents Educational Television Project, which reaches schools within a hundred-mile radius of New York City, has expanded from twelve programs and 20,000 students in the fall of 1958 to fifty-five programs and one million students in the fall of 1960.

The continuing activation of new educational-television channels, the flexibility offered by videotape in recording, exchanging, and scheduling televised courses, and the emergence of networks linking schools and colleges are all aspects of the broadening frontier of educational television. Finally, in the early 1960s, airborne television will demonstrate the impact on the quality of teaching and learning of massive application of the medium.

Television can be used—and in some places is being used—to do the traditional job of education, and to do it well. However, those who have had experience with the medium know that, if wisely and imaginatively used, it also can bring to students educational experiences far beyond what is possible in the conventional classroom. Students in today's classrooms can be eyewitnesses to history in the making. They can have a closeup view of physical and chemical processes that cannot be duplicated in any but the most expensive laboratories—indeed, some that cannot be duplicated in any laboratory. They can see and hear the outstanding scholars of our age. They can have access to the great museums of art, history, and nature. A whole treasure-trove of new and stimulating experiences that were beyond the reach of yesterday's students can be brought into the classroom for today's students.

Also, television makes possible exciting new developments in the team approach to teaching, in which the particular skills and competencies of many teachers are used cooperatively in planning and presenting courses. The status and rewards of teaching can be vastly enhanced by this new medium.

It is important to bear in mind, however, that television is essentially neutral. It can transmit the bad as well as the good, the mediocre as well as the superior. Consequently, it demands the very best of creative, imaginative talent if it is to do its job well.

Television is not a panacea that will cure all the ills of American education or solve all its problems. It has been described, and rightly so, as the most important new educational tool since the invention of movable type, but like the textbook the new medium is essentially just that—a tool. Like any tool, it can be misused or badly used. But if it is wisely and imaginatively used, television can play a major role in broadening and enriching the education of American students.

Appendix I

PERSONS TO CONTACT FOR INFORMATION ABOUT TELEVISION EXPERIMENTS

Colleges

University of Akron

Norman Auburn
President, University of Akron
Akron, Ohio

University of Arizona

F. Pendleton Gaines, Jr.
Dean, Continuing Education
University of Arizona
Tucson, Arizona

Central Michigan University

Charles Park
Director, Department of Special Studies
Central Michigan University
Mt. Pleasant, Michigan

Chicago City Junior College

Clifford G. Erickson
Dean, Television Instruction
Chicago City Junior College
Chicago, Illinois

Dade County Junior College

Kenneth R. Williams
President, Dade County Junior College
Miami, Florida

University of Detroit

William J. Murphy
Coordinator, Communications Department
University of Detroit
Detroit, Michigan

University of Florida

Kenneth Christiansen
Director of Television
University of Florida
Gainesville, Florida

University of Houston

Richard Evans
Psychology Department
University of Houston
Houston, Texas

University of Illinois

Charles McIntyre
Coordinator of Instructional Television
University of Illinois
Urbana, Illinois

Lindenwood College for Women

Franc McCluer
President, Lindenwood College for Women
St. Charles, Missouri

Miami University

F. G. Macomber
Dean, Educational Services
Miami University
Oxford, Ohio

University of Minnesota

Walter W. Cook
Dean, College of Education
University of Minnesota
Minneapolis, Minnesota

University of Missouri

Bart Griffith
Director, Instructional Television
Extra-Divisional Administration
University of Missouri
Columbia, Missouri

Montana State College

Hardy D. Berry
Department of Film and TV Production
Montana State College
Bozeman, Montana

National College of Education

K. Richard Johnson
President, National College of Education
Evanston, Illinois

University of New Hampshire

Jere Chase
Director of Development
University of New Hampshire
Durham, New Hampshire

University of New Mexico

Tom L. Popejoy
President, University of New Mexico
Albuquerque, New Mexico

New York University

Thomas C. Pollock
Dean, Washington Square College of Arts and Sciences
New York University
New York, New York

North Carolina State College

John W. Cell
Professor, Department of Mathematics
North Carolina State College
Raleigh, North Carolina

Oregon State System of Higher Education

Glenn Starlin
Director, Inter-Institutional Television Teaching Project
University of Oregon
Eugene, Oregon

Pacific Lutheran University

S. C. Eastvold
President, Pacific Lutheran University
Tacoma, Washington

Pennsylvania State University

C. R. Carpenter
Director, Division of Academic Research and Services
Pennsylvania State University
University Park, Pennsylvania

St. Petersburg Junior College

Floyd Christian
Superintendent, Pinellas County Board of Public Instruction
Clearwater, Florida

San Francisco State College

Leo F. Cain
Vice President
San Francisco State College
San Francisco, California

Southern Illinois University

Delyte Morris
President, Southern Illinois University
Carbondale, Illinois

Stephens College

Seymour A. Smith
President, Stephens College
Columbia, Missouri

Texas Education Agency

J. W. Edgar
Commissioner of Education
Texas Education Agency
Austin, Texas

University of Texas

Robert F. Schenkken
Director, Radio and Television
University of Texas
Austin, Texas

Washington State University

Vernon Davies
Sociology Department
Washington State University
Pullman, Washington

Wayne State University

Frank Rosecrance
Dean, College of Education
Wayne State University
Detroit, Michigan

Western Michigan University

George Mallinson
Dean, Graduate School
Western Michigan University
Kalamazoo, Michigan

Schools

Alabama Public Schools

Edwin L. Williams, Jr.
Coordinator, Alabama In-School ETV Program
State Department of Education
State Office Building
Montgomery, Alabama

Alachua County, Florida, Public Schools

E. D. Manning, Jr.
Superintendent of Schools
Alachua County Board of Public Instruction
Gainesville, Florida

Anaheim, California, Public Schools

James D. Brier
TV Project Coordinator
Anaheim City School District
Anaheim, California

Atlanta Board of Education

Douglas Rumble, Jr.
Board of Education, City of Atlanta
Atlanta, Georgia

Buena Vista, Michigan, School District

Joseph G. Barr
Superintendent of Schools
District Office
3945 Holland
Saginaw, Michigan

Central Michigan Public Schools

Martin Adkins
Director of TV Project
Central Michigan Educational Television Council
Central Michigan University
Mt. Pleasant, Michigan

Chelsea Closed-Circuit Television Project

Harold S. Marder
Director, Chelsea Closed-Circuit Television Project
436 West 27th Street
New York, New York

Clover Park, Washington, Public Schools

T. Olai Hageness
Superintendent of Schools
Clover Park Schools
Tacoma, Washington

Columbus Area Public Schools

Richard B. Hull
Director, Radio-TV Broadcasting
Ohio State University
Station WOSU-TV
Columbus, Ohio

Des Moines and Polk County Public Schools

Elaine Merkley
Director of Educational Television
Des Moines Public Schools
Des Moines, Iowa

Detroit Public Schools

Elmer F. Pflieger
Coordinator, Television Teaching Project
Detroit Public Schools
Detroit, Michigan

Florida West Coast Educational Television

Thomas H. Rothchild
Director of TV Project
WEDU-TV St. Petersburg Studio
St. Petersburg Junior College
St. Petersburg, Florida

Jefferson County and Kentuckiana Educational Television

Kenneth F. Lam
Director, Jefferson County Educational Television
Hawthorne School
Louisville, Kentucky

Kansas City Public Schools

Carlotta V. Cunning
TV Project Supervisor
Kansas City Public Schools
Kansas City, Missouri

Miami Public Schools

Clif Mitchell
Director, ETV Project
Lindsey Hopkins Educational Center
Miami, Florida

Milwaukee Public Schools

Robert R. Suchy
Director of Educational Television
Milwaukee Public Schools
Milwaukee, Wisconsin

Nebraska State Department of Education

Jack McBride
Director of Television and Station KUON-TV
University of Nebraska
Lincoln, Nebraska

Norfolk Public Schools

Grace Johnson
Norfolk City Schools ETV Center
Norfolk, Virginia

North Carolina Public Schools

Charles W. Phillips
Director, North Carolina In-School Television Project
Woman's College
Greensboro, North Carolina

Oklahoma City and State Public Schools

T. H. Broad
Director of Television Project
Oklahoma City Public Schools
Oklahoma City, Oklahoma

Philadelphia Public Schools

Martha A. Gable
Director, Radio and Television Education
Board of Public Education
School District of Philadelphia
Philadelphia, Pennsylvania

Southwestern Indiana Educational Television Council

Glen H. Traw
Director of Educational Television
Carpenter School Building
Evansville, Indiana

Washington County, Maryland, Public Schools

William Brish
Superintendent of Schools
Board of Education of Washington County
Hagerstown, Maryland

Wichita Public Schools

Blanche E. Owens
Director of Television Project
Wichita High School South
Wichita, Kansas

Educational Television Networks

Alabama

Edwin L. Williams, Jr.
Coordinator, Alabama In-School ETV Program
State Department of Education
State Office Building
Montgomery, Alabama

Florida

James Etheridge, Jr.
Executive Secretary
Florida Educational Television Commission
Tallahassee, Florida

Michigan

Lynn Bartlett
Superintendent, Michigan Department of Public Instruction
Lansing, Michigan

George G. Mallinson
Dean, School of Graduate Studies
Western Michigan University
Kalamazoo, Michigan

New England and Middle Atlantic States

Hartford N. Gunn, Jr.
General Manager
WGBH-TV Educational Foundation
Boston, Massachusetts

Rocky Mountain and West Coast States

Harold L. Enarson
Director, Western Interstate Commission for Higher Education
Fleming Law Building
University of Colorado
Boulder, Colorado

Upper Midwest States

John C. Schwarzwalder
General Manager
KTCA-TV
Twin City Area Educational Television Corporation
St. Paul, Minnesota

Airborne Television

John H. Worthington
Midwest Program on Airborne Television Instruction
228 North LaSalle Street
Chicago, Illinois

Appendix II

COLLEGES AND UNIVERSITIES OFFERING TELEVISED COURSES FOR CREDIT (1959-60)

ALABAMA:

- University of Alabama
- Auburn University

ARIZONA:

- Arizona State University
- University of Arizona
- Phoenix College

ARKANSAS:

- University of Arkansas

CALIFORNIA:

- American River Junior College
- California State Polytechnic College
- University of California:
  - Berkeley
  - Los Angeles
  - Santa Barbara
- Chico State College
- Compton District Junior College
- Fresno State College
- Fullerton Junior College
- Los Angeles City College
- Los Angeles State College
- Occidental College
- Orange Coast College
- Riverside City College
- Sacramento State College
- San Diego Junior College
- City College of San Francisco
- Stanford University

COLORADO:

- Adams State College
- Colorado State University

CONNECTICUT:

- Central Connecticut State College
- Connecticut College
- University of Connecticut
- Hartford College
- Mitchell College
- Southern Connecticut State College
- Yale University

DELAWARE:

- University of Delaware

DISTRICT OF COLUMBIA:

- American University
- Gallaudet College
- George Washington University

FLORIDA:

- Central Florida Junior College
- Dade County Junior College
- Florida Christian College
- Florida State University
- University of Florida
- Gibbs Junior College
- Hampton Junior College
- Jacksonville University
- Manatee Junior College
- Miami Junior College
- University of Miami
- Roosevelt Junior College
- St. Johns River Junior College
- St. Petersburg Junior College

GEORGIA:

- University of Georgia
- Valdosta State College

IDAHO:

- Boise Junior College

ILLINOIS:

- Bradley University
- Chicago City Junior College
- Columbia College
- De Paul University
- Illinois Institute of Technology
- Illinois State Normal University
- University of Illinois:
  - Urbana
  - College of Medicine (Chicago)
- Millikin University
- Mundelein College
- National College of Education
- Northwestern University
- Rockford College
- St. Xavier College
- Southern Illinois University
- Western Illinois University

INDIANA:

- Evansville College
- Indiana State Teachers College
- Indiana University:
  - Bloomington
  - School of Dentistry(Indianapolis)
- University of Notre Dame
- Purdue University

IOWA:

- Drake University
- Iowa State Teachers College

- Iowa State University of Science and Technology
- State University of Iowa
- Morningside College
- Upper Iowa University

KANSAS:

- Fort Hays Kansas State College
- Kansas State College of Pittsburg
- University of Kansas Medical Center
- St. Mary's College (of St. Louis, Mo., University)
- University of Wichita

KENTUCKY:

- University of Kentucky
- University of Louisville
- Murray State College

LOUISIANA:

- Louisiana State University
- St. Mary's Dominican College
- Southern University
- Tulane University
- Xavier University

MAINE:

- Farmington State Teachers College
- Washington State Teachers College

MARYLAND:

- University of Baltimore
- University of Maryland
- Western Maryland College

MASSACHUSETTS:

- American International College
- Boston University
- Emerson College
- Endicott Junior College
- Harvard University
- Lowell Technological Institute
- Massachusetts Institute of Technology
- Northeastern University
- Tufts University

MICHIGAN:

- Central Michigan University
- University of Detroit
- Eastern Michigan University
- Michigan State University
- University of Michigan
- Wayne State University
- Western Michigan University

MINNESOTA:

- Gustavus Adolphus College
- University of Minnesota
- St. Cloud State College
- Winona State College

MISSOURI:

- Culver-Stockton College
- Harris Teachers College
- Lindenwood College for Women
- University of Missouri
- Northwest Missouri State College
- St. Louis University

MONTANA:

- College of Great Falls
- Montana State University

NEBRASKA:

- Concordia Teachers College
- Municipal University of Omaha
- University of Nebraska

NEW HAMPSHIRE:

- University of New Hampshire
- Plymouth Teachers College

NEW JERSEY:

- Glassboro State College

NEW MEXICO:

- University of New Mexico

NEW YORK:

- King's College
- Nazareth College
- New School for Social Research
- State University of New York:
  - Agricultural and Technical Institute, Farmingdale
  - College of Agriculture at Cornell University
  - College of Education at Brockport
  - College of Education at Buffalo
  - College of Education at Cortland
- New York University
- Notre Dame College of Staten Island
- Rensselaer Polytechnic Institute
- University of Rochester
- St. Bonaventure University
- Syracuse University
- Union College and University Medical College (Albany)

NORTH CAROLINA:

- Agricultural and Technical College of North Carolina
- East Carolina College
- University of North Carolina:
  - State College of Agriculture and Engineering
  - Woman's College

Queens College
Western Carolina College

NORTH DAKOTA:

North Dakota Agricultural College
University of North Dakota

OHIO:

University of Akron
Central State College
University of Dayton
Miami University
Mount Union College
Ohio State University
Ohio University
Ohio Wesleyan University
University of Toledo
Western Reserve University
Wittenberg University

OKLAHOMA:

Oklahoma College for Women
University of Oklahoma

OREGON:

Oregon College of Education
Oregon State College
Oregon Technical Institute
University of Oregon
Portland State College
University of Portland
Willamette University

PENNSYLVANIA:

Clarion State College
Duquesne University
Indiana State College
La Salle College
Lock Haven State College
Marywood College
Millersville State College
Mount Mercy College
Pennsylvania State University
University of Pennsylvania
University of Pittsburgh
West Chester State College

RHODE ISLAND:

Brown University
Providence College
Rhode Island College

TENNESSEE:

East Tennessee State College
Fisk University
George Peabody College for
  Teachers
Middle Tennessee State College
University of Tennessee

TEXAS:

Abilene Christian College
Agricultural and Mechanical
  College of Texas
Amarillo College
East Texas State College
University of Houston
North Texas State College
St. Mary's University of
  San Antonio
Southern Methodist University
Texas Christian University
Texas Western College
University of Texas
Trinity University

UTAH:

Utah State University
University of Utah
Weber College

VERMONT:

University of Vermont

VIRGINIA:

Longwood College
Medical College of Virginia
Virginia State College (Petersburg)
Virginia Union University
University of Virginia
  (Charlottesville)
College of William and Mary

WASHINGTON:

Central Washington College
  of Education
Pacific Lutheran University
Seattle University
Washington State University
University of Washington
Western Washington College
  of Education
Whitworth College

WEST VIRGINIA:

Concord College
Fairmont State College
Morris Harvey College
West Liberty State College
West Virginia University

WISCONSIN:

Milwaukee Institute of Technology
Northland College
Wisconsin State College:
  Eau Claire
  Superior
University of Wisconsin

COLLEGES AND UNIVERSITIES OFFERING CREDIT FOR "CONTINENTAL CLASSROOM"

ALABAMA:

Spring Hill College
Tuskegee Institute

ARIZONA:

Arizona State College
University of Arizona

ARKANSAS:

Agricultural, Mechanical, and Normal College
Arkansas Agricultural and Mechanical College
Arkansas Polytechnic College
Arkansas State College
University of Arkansas
Henderson State Teachers College
Southern State College

CALIFORNIA:

University of California:
  Berkeley
  Los Angeles
East Los Angeles College
Fresno State College
Humphreys College
Immaculate Heart College
Los Angeles City College
Marymount College
San Diego State College
Santa Ana College
Stockton College
University of Redlands
Yuba College

COLORADO:

Adams State College
Colorado State College
University of Colorado
Pueblo Junior College

CONNECTICUT:

Annhurst College
Central Connecticut State College
Danbury State College
Hillyer College (University of Hartford)
Saint Joseph College
Southern Connecticut State College

DELAWARE:

University of Delaware

DISTRICT OF COLUMBIA:

Washington Missionary College

FLORIDA:

Bethune-Cookman College
Florida Agricultural and Mechanical University
Florida Southern College
Florida State University
University of Florida
St. Johns River Junior College

GEORGIA:

Albany State College
Andrew College
Berry College
Emory University
University of Georgia
Valdosta State College

ILLINOIS:

Carthage College
Chicago Teachers College
Eastern Illinois University
Illinois State Normal University
Moline Community College
Mount Vernon Community College
Mundelein College
Quincy College
Rockford College
Southern Illinois University
Western Illinois University

INDIANA:

Grace Theological Seminary and Grace College
Indiana State Teachers College
Indiana University
Manchester College
Marian College
Purdue University
St. Francis College
St. Mary's College

IOWA:

Buena Vista College
Clarke College
Creston Community College
Iowa State Teachers College
Iowa State University of Science and Technology
State University of Iowa

Keokuk Community College
Luther College
Marycrest College
Morningside College
Mount Mercy College
St. Ambrose College
Westmar College

KANSAS:

Bethany College
Dodge City College
Fort Hays Kansas State College
Friends University
Garden City Junior College
Kansas State College of Pittsburg
Kansas State Teachers College
Marymount College
McPherson College
Sacred Heart College
Saint Mary College
Sterling College
Washburn University of Topeka
University of Wichita

KENTUCKY:

University of Kentucky
University of Louisville
Morehead State College
Murray State College
Nazareth College
Ursuline College
Western Kentucky State College

LOUISIANA:

Centenary College
Louisiana State University:
  Baton Rouge
  New Orleans
Loyola University
Southern University
University of Southwestern Louisiana

MAINE:

University of Maine

MARYLAND:

University of Maryland
Mount St. Agnes College
College of Notre Dame of Maryland
Washington College

MASSACHUSETTS:

Anna Maria College for Women
Boston University
Bradford Durfee College of Technology
Harvard University
College of Our Lady of the Elms

MICHIGAN:

Bay City Junior College
Central Michigan University
Kalamazoo College
Michigan College of Mining and Technology
Michigan State University
Port Huron Junior College
Western Michigan University

MINNESOTA:

Concordia College
Ely Junior College
Hibbing Junior College
Mankato State College
University of Minnesota
Moorhead State College
St. Cloud State College
College of St. Teresa

MISSISSIPPI:

Jackson State College
Mississippi College
Prentiss Normal and Industrial Institute

MISSOURI:

Central Missouri State College
Culver-Stockton College
Fontbonne College
Harris Teachers College
Lindenwood College for Women
University of Missouri
Northeast Missouri State Teachers College
Rockhurst College
Southwest Missouri State College
Washington University

MONTANA:

Eastern Montana College of Education
College of Great Falls
Montana State University
Rocky Mountain College

NEBRASKA:

Concordia Teachers College
Dana College
Municipal University of Omaha
Nebraska State Teachers College

NEW JERSEY:

Georgian Court College
Glassboro State College
Jersey City State College
Montclair State College
Rutgers University
College of St. Elizabeth
Stevens Institute of Technology

NEW MEXICO:

New Mexico State University
University of New Mexico
New Mexico Western College

NEW YORK:

Alfred University
Auburn Community College
Canisius College
Good Counsel College
Hunter College
King's College
Marist College
Maryknoll Teachers College
Mohawk Valley Technical Institute
State University of New York:
  Agriculture and Technical Institute, Farmingdale
  College of Education at Potsdam
Niagara University
Notre Dame College of Staten Island
Pace College
St. Francis College

NORTH CAROLINA:

Bennett College
Flora Macdonald College
Johnson C. Smith University
University of North Carolina Woman's College
Queens College
Sacred Heart Junior College and Academy

NORTH DAKOTA:

University of North Dakota
State Teachers College at Minot

OHIO:

Baldwin-Wallace College
Bowling Green State University
Central State College
John Carroll University
Miami University
Muskingum College
Ohio College of Applied Science
Ohio State University
Ohio Wesleyan University
Otterbein College
Our Lady of Cincinnati College
College of Steubenville
Ursuline College
Wilberforce University
Wittenberg University

OKLAHOMA:

Benedictine Heights College
Central State College
Northeastern State College
Oklahoma State University
University of Oklahoma
Panhandle Agricultural and Mechanical College
Phillips University
University of Tulsa

OREGON:

Lewis and Clark College
Oregon College of Education
Oregon State College
Southern Oregon College
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PENNSYLVANIA:

California State College
Cannon College
College Misericordia
Geneva College
Holy Family College
Immaculata College
Indiana State College
King's College
La Salle College
Mansfield State College
Marywood College
Millersville State College
Mount Aloysius Junior College
Pennsylvania State University
University of Pittsburgh
St. Vincent College
Seton Hill College
Shippensburg State College
West Chester State College
Villanova University

RHODE ISLAND:

Rhode Island College

SOUTH CAROLINA:

Bob Jones University
Furman University

SOUTH DAKOTA:

Augustana College
Dakota Wesleyan University
Yankton College

TENNESSEE:

University of Chattanooga
East Tennessee State College
Middle Tennessee State College
Siena College
Tennessee Wesleyan College
Vanderbilt University

TEXAS:

Arlington State College

Baylor University
University of Dallas
Hardin-Simmons University
Incarnate Word College
Lamar State College of Technology
Midwestern University
North Texas State College
Our Lady of the Lake College
Pan American College
Prairie View Agricultural and
  Mechanical College
St. Mary's University of
  San Antonio
University of St. Thomas
San Antonio College
Southwestern University
University of Texas
West Texas State College

UTAH:

Utah State University

VERMONT:

University of Vermont

VIRGINIA:

Madison College
Virginia State College
Virginia Union University
University of Virginia
College of William and Mary

WASHINGTON:

Centralia Junior College
Eastern Washington College
  of Education
Lower Columbia Junior College
University of Puget Sound
St. Martin's College
University of Washington
Western Washington College
  of Education
Whitworth College
Yakima Valley Junior College

WEST VIRGINIA:

Bethany College
Concord College
Fairmont State College
Glenville State College
Marshall College
West Liberty State College
West Virginia State College

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Holy Family College
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* In January, 1957, Mr. Faust became a vice president of the Ford Foundation in charge of its Education program. In May, 1958, Mr. Eurich was appointed Executive Director of the Foundation's Education program, Mr. Coombs was appointed Program Director, and Mr. Nelson, an Associate Program Director. All four officers are continuing their present duties with the Fund for the Advancement of Education, helping to coordinate its activities with the Foundation's Education program.

The following publications are currently available without charge on request from the FORD FOUNDATION, Office of Reports, 477 Madison Avenue, New York 22, N.Y.

THE FORD FOUNDATION ANNUAL REPORT

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THE DIFFERENCE IT MAKES: A description of some of the ways in which hospitals used funds received under the Foundation's concluded $200 million program to expand and improve their services.

THE FORD FOUNDATION AND ST. LOUIS: The story of the Foundation's assistance to civic and educational progress in a representative American community.

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TIME, TALENT, AND TEACHERS: Experiments assisted by the Foundation and the Fund for the Advancement of Education in new arrangements to improve the utilization of school and college teachers.

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STATE AND REGIONAL BOOKLETS: Summaries and listings of Foundation grants in each state. (Note: booklets for the states of Hawaii, Indiana, Michigan, New York, Ohio, and West Virginia are out of print.)

The following publications are currently available without charge on request from the FUND FOR THE ADVANCEMENT OF EDUCATION, 477 Madison Avenue, New York 22, New York.

A REPORT FOR 1957-59, THE FUND FOR THE ADVANCEMENT OF EDUCATION.

BETTER UTILIZATION OF COLLEGE TEACHING RESOURCES: Reports by the Committee on Utilization of College Teaching Resources (second-year report, October, 1957; summary report, May, 1959).

ENCOURAGING THE EXCELLENT, Elizabeth Paschal: A report on special programs for gifted and talented students.

FORTIFYING HIGHER EDUCATION, A STORY OF COLLEGE SELF STUDIES, Robert S. Donaldson.

NEW DIRECTIONS IN TEACHER EDUCATION, Paul Woodring: An interim report of the work of the Fund for the Advancement of Education in the areas of teacher education and recruitment.

SCHOOLS FOR TOMORROW: AN EDUCATOR'S BLUEPRINT, Alexander J. Stoddard: A survey of the possible uses of television in elementary and secondary schools.

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THEY WENT TO COLLEGE EARLY: A report on the Early Admission to College Program.

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